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## ENLARGING OF THE ERIE CANAL.

With a persistency that is worthy of a better cause the New York Sun continues to pound the 1,000-ton barge canal proposition. Every day it has something or other to say upon the subject—always on the dark side. The creation of another avenue of transportation will undoubtedly ruin the country, according to this authority. The attitude of the Sun is not easily understood. It is a New York product, and if the barge canal will aid anything it will aid New York. Surely New York has nothing to lose by the addition of an adequate waterway into her port. New York will gain and the commerce of the great lakes will gain by the divergence of grain shipments from southern to a more northerly port. The latest article in the Engineering News is nuts for the Sun. "Nothing less than an economic crime," is what the Engineering News calls the proposition to expend \$100,000,000 upon the enlargement of the Erie canal. Now the Engineering News views the matter from quite another attitude than that taken by the Sun. The Sun is probably apposed to any improvement of waterway whatever. The Engineering News is in favor of a ship-canal but opposed to a barge canal; it is in favor of the Lake Ontario route as against the all-American waterway. The Ontario route is not feasible for barge purposes because a vessel, especially constructed for economical canal transit, is not adapted for open lake navigation. This has been demonstrated and calls for no further discussion. The Engineering News wants the ordinary type of lake freighter to take its cargo directly to the coast, thus avoiding the re-handling of cargo. Such an undertaking calls for a ship-canal. There are plenty of engineers willing to stake their professional reputation that such a canal would not pay. Its first cost would be enormous and the operation of a 6,000-ton vessel through it an extremely slow process. The real reason why the lake carrying charges are the lowest in the world is that the freighters are kept plying like shuttlecocks at full speed from shipping port to receiving port and wasting as little time as possible in port. This condition would be defeated in a ship-canal. It would be impossible for these big freighters to make good time in a ship-canal. They would have to be very carefully handled, to be continually feeling their way and the time consumed in transit would extinguish profits. It is not likely that the actual freight charge from Duluth to New York, provided it were possible for a big freighter to make the entire journey, would be any less than under a system whereby the big vessel would discharge her cargo into barges at Buffalo. While the barges were forging their way to New York the freighter would be speeding back to Duluth for another cargo. The fact that she has the open lake to operate in enables her to bring her cargo to Buffalo for something less than a tenth of a cent per ton per mile. Should she be compelled to carry her cargo to New York, the devious windings of the canal would greatly advance the per ton-mile rate, and probably to a figure beyond what the barges could carry it for. Why strive for a chimerical thing? Why strive for a great waterway which may not be economical when it is obtained? None of the great canals, save those which connect open seas and lead to continents, are profitable. The Manchester canal has since its completion been in arrears on even its interest charges. Why not accept that which is feasible, that which can be secured in a reasonable period of time and by the assumption of a modest interest charge; that which will be all-American and never subject to international complications and that which will permit the grain of the great northwest to reach the coast by an all-water route? The whole nation gains by the development of an economical avenue of distribution. No one loses, not even the railways for they gain in other directions by the founding of other enterprises and the wider distribution of wealth. The farmer of the northwest buys machinery with the added income which he obtains from a lower transportation rate for his grain; and it is the railway which must bring the machinery to his farm. Every new want that he instinctively inherits with every addition to his income must pay the tribute of freight to the railway. Railway managers are making a mistake in opposing the enlargement of the Erie canal. Suppose that by some great convulsion of nature the great lakes should be dried up. Does anyone suppose that the 50,000,000 tons or more of freight that the lake vessels handled last year would go to the railways? No. The business which created it would simply cease to exist and the railways would suffer equally with the cities along its shores. New means of transportation can do nothing else than expand trade. They cannot by any possibility contract it. A barge canal traversing New York state would vastly enrich that commonwealth. As ore is the king of freight on the lakes so grain would be on the canal; but it would be a mistake to suppose that grain would be its only commodity, as

it would be a mistake to suppose that ore is the only commodity handled on the lakes. The farms abutting on the pikes leading to the canal would profit because their produce could reach the market more cheaply. Even the railways would share, for they would be required to haul produce to the canal. Various subsidiary industries would spring up spontaneously. It is the development of transportation which has sowed the seed out of which cities have grown. Were it not for the perfection of our avenues of transportation village life would still be the life of the world. What other force has so multiplied wealth by bestowing initiative upon the individual? Is it by making a man pay \$2 for an article that is worth only \$1 that wealth is produced. No. That leads to poverty and contraction. It is by lessening cost that wealth multiplies and becomes disseminated. If a barge canal can lay grain on the seaboard at a lower cost than the railway, in so far it bestows a benefit upon the nation from whose blessing even the railway cannot escape. Money is useful only when employed. The merchant who pays 2 cents for the carriage of a commodity instead of 3 cents will have 1 cent to put to other uses. The progress of the world comes by the lessening of costs. A thing which is expensive can be enjoyed only by a few. The Engineering News says that fifty years hence the 12-ft. barge canal may be as useless as the 7-ft. waterway is now. Very well. That is no concern of ours. Fifty years hence we shall all have gone to our eternal account; but it is our duty to do what we can while we are alive. Fifty years ago it would have been a sorry thing to have said that a 10-ft. canal at Sault Ste. Marie would be useless because fifty years hence it would be inadequate. It was ample for the time. Fifty years is a long time. Many things will have occurred; many problems will have been solved by then; transportation itself may be revolutionized. We should do what we can with the means at our command. A 12-ft. canal is better than a 7-ft. one. Even the Engineering News cannot gainsay that. Let us have what we can have and not strive for that which we know we cannot have.

## OFFENDED AT CARNEGIE.

Recently in London Andrew Carnegie gave out an interview which seriously offended Canadians. In it Mr. Carnegie was represented as stating that the iron and steel industry of Cape Breton was a mirage. The town of Sydney very promptly returned the sum of \$15,000 which Mr. Carnegie had given to aid in the establishment of a library there. This in turn wounded Carnegie in his tenderest spot and he replied saying that he was very sorry if he had said anything to wound the feelings of Canadians.

"I have no desire to underrate Canada's efforts," said he, "and do not remember using the word mirage, and it is wholly inapplicable. I know they are making steel, or intend to make finished steel in Nova Scotia, and have no doubt they would succeed. On the other hand it is ridiculous to compare what 1,000,000 people can do with what 80,000,000 can do. The United States is making more steel than all the rest of the world. If views are to have weight figures and facts must be recognized."

Mr. Carnegie added that he has the warmest feeling for Canada. To show that it is sufficiently palliated Sydney should now take his money from him.

## STEEL CORPORATION'S BOND CONVERSION PLAN.

Members of the United States Steel Corporation syndicate formed to underwrite the conversion of \$200,000,000 of 7 per cent. preferred stock into a like amount of 5 per cent. bonds, and who subscribed for \$20,000,000 more in cash at par, received their bonds on Monday. About \$80,000,000 in stock was turned in, which with the cash purchase of \$20,000,000 makes \$100,000,000. In addition it is understood that about \$50,000,000 in preferred stock was turned in by shareholders, though J. P. Morgan & Co. would say nothing definite upon this score. The bonds broke away sharply, reaching 85 $\frac{3}{4}$  and the preferred remaining at 83 $\frac{3}{4}$ .

The last river and harbor bill contained a clause providing on the part of the United States for an international commission to deal with the important question of lake levels and also with a report on the advisability of constructing a dam at the outlet of Lake Erie. The president was authorized to take up with Great Britain the matter of three members of the commission to be appointed from Canada and to himself appoint three members from the United States. Nothing has been heard from the president on the subject although the river and harbor bill referred to was passed several months ago. It is now said that names of members of the commission from the United States will be announced upon the president's return to Washington.



## SUBMARINES—PEACE, WAR AND EXPLORATION.

While as an engine of war the submarine is of doubtful expediency it would seem as though it might be of some service in the prosaic business of salvage. How much better it would be for submarine inventors to direct their attention to recovering the lost treasures of the deep than it would be to maintain expensive lobbies at Washington for the sole purpose of selling to the government submarine torpedo boats whose usefulness is yet to be proved. Salvage offers a rich field for the ingenuity of the inventor. Beyond a certain depth, and a very limited one at that, there is at present no practical means of recovering vessels or their cargoes. So enormously does pressure increase as one descends below the surface of the sea that vessels become mere shattered hulks. Occasionally imaginative or optimistic wreckers endeavor to salvage vessels at unusual depths but the story is one of unbroken failure. Cavaliere Pino is the first submarine inventor to discard the submarine for purposes of warfare and to turn his energies to essentially practical lines. If all accounts are to be believed he is pursuing some very interesting experiments in the gulf of Genoa with what he calls his "under-water working boat." He has designed a boat to resist the enormous pressures that accumulate with depth and has been so successful as to have descended in safety to a depth of 400 ft. The boat is spherical in form with a diameter of 10 ft. and has accommodations for a working crew of two persons. Its practicability lies in the fact that it is equipped with arms passing into the boat through universal watertight joints and possessing powerful gripping qualities. Reliable data concerning this invention is not yet at hand, but if it can descend to so great a depth as 400 ft. and is a moderately controllable body at that depth, it has in so far widened the field of legitimate salvage.

The mind of man is so constituted that flying machines and submarine navigation have qualities which appeal irresistibly to it. A man may have a diseased imagination but perfectly sound judgment so that his common sense is forever waging war with his credulity; or he may have unsound judgment with a perfectly healthy imagination; and if he belongs to the latter category he will attempt to fly or to reach the north pole in a submarine boat. In the Review of April 23 it was related that Herr Scholl of Munich and Dr. Anschütz Kuempfe had undertaken to discover the pole by the under-water route. Since then Dr. Kuempfe has elaborated his plan. He has discovered an interesting circumstance—that the field of pack ice never exceeds a diameter of more than 3 miles or so. The "or so" is somewhat indefinite but no matter. The maximum depth of this ice, says Dr. Kuempfe, does not exceed 80 ft. The proposed vessel will be capable of descending to a depth of 160 ft., where it will be entirely removed, in Dr. Kuempfe's opinion, from the influence of colds, storms and ice pressure and the way to the pole will be open. No mention is made of the pressure of the water itself. The length of time during which the submarine will be able to remain below the surface of the water is calculated at a maximum of fifteen hours, which at the modest rate of 3 knots will allow it to cover a distance of 50 miles. In the not altogether improbable contingency of no opening being met with within the fifteen hours there remains the possibility of opening a way by blasting at a weak point in the ice "to be indicated without possibility of mistake by the help of the manometer." It probably has not occurred to the professor that there may be no weak spot in the ice, and even if there were what would be the effect of the blast upon the submarine itself? However these are merely details. Let us quote the professor.

"On arrival at the ice pack the direction of the first open water will be taken by the compass, and the boat being submerged a course will be steered for it. If after an hour or so the light shows that an opening has been reached the vertical screw will be stopped and the boat will rise by its own buoyancy, and in the case of a wide opening or channel leading northward the voyage will be continued on the surface, giving an opportunity for scientific work. Supposing no gleam of light appears when six hours have elapsed an ascent to the lower surface will be made with caution and the voyage continued slowly until by the reading of the manometer, it is found that a thin place has been reached. Here attempts will be made by blasting to effect an opening which, however small, will be sufficient to supply air for another fifteen hours, while in case of failure there will still be time to return to the last opening that has been felt whence the voyage will be prosecuted in a slightly different direction."

Does not Dr. Kuempfe know that once he is below the surface he is in total darkness, that his compass is beset by influences which render it inoperative and that his submarine is as blind as a bat? The amazing thing is that an undertaking of this kind so excites the credulity of a fair portion of mankind that they willingly advance money to further it.

The submarine as an engine of war is at the best merely the instrument of the weak. A powerful navy has no need of it. The indifference of Britain to the submarine arouses the suspicion that it has the means to effectually overcome this type of craft. At any rate the submarine torpedo boat destroyer is beginning to be talked about. It would appear from what Capt. Charles A. McEvoy, an English naval officer, says that the presence of the submarine can be discovered. In her case discovery means destruction because the submarine has no other means of defense than invisibility.

## SOME REASONING AND A PROPHECY.

Is it not one of the most amazing things that men who have labored all their lives to found their business and who know by what patient toil, by what stress and strain, by what nervous worry and cruel tax upon resource the business was gradually placed upon a successful basis, is it not amazing that these same men will complacently turn over their factories and their workshops and accept in payment therefor sheafs of new securities whose actual value in the market is an indeterminate factor? In this manner are combinations made and so-called trusts established. Stock which has meant cash and time invested is replaced by a security which represents nothing but promise. Not always so, as there are cash considerations in some of the best combinations, but promises enter largely into most of them. The factory is gone and in its place is a strong box containing reams of finely embossed paper with the captivating stamp of 7 per cent. upon it. Then comes the long wait for dividends and for the enormous profits which are to grow out of the single item of economies effected. The dividends do not come and the economies are not sufficient to stifle competition. The weakest adversary of aggressive individualism is the latter-day trust. Experience ought to bring wisdom with it; but there are business men who close their eyes to the force of their own reasoning and bask in the sunshine of the prospectus. Credulity and cupidity are the two elements in human nature which transmute the promoter's paper into currency. Common sense should teach men that the same serious work which made their own business a success will be required to make the combination a success. Of course there are combinations and combinations. A combination which controls the supply of its raw resources is not in this reckoning; but this is a variety which may be counted upon the fingers of one hand. It is the ordinary combinations which do not lend themselves to monopoly that are under discussion—and their name is legion. Probably in the history of the world there has been no such period as has marked the past five years. Even in far away Manchuria trade has doubled; Europe has been under the wand of some magician; and as far as the United States is concerned Aladdin has rubbed his lamp overtime. The promoter has blossomed like the rose and money has been found to foster enterprises of such preposterous character as to stagger one's imagination. Certain conservative trades have seized upon the fertility and looseness of the soil to take a deeper root; but the majority have run to surface vines, showy, but of such tendril as to wither at the first blast. One is going to live; the other is going to die. It ill becomes one to croak, like a raven, at the golden shower; but common sense should teach one that the weather must change. The base of all this present prosperity is iron, and the greatest of iron makers says that iron is either a prince or a pauper. Such has been its history and such, it is fair to presume, will continue to be its history, probably not as marked in the future as in the past, owing to the existence of certain forces which exercise a partial control, such as the Steel Corporation. But even the Steel Corporation cannot create consumption. It is undeniably true that one of the great causes of the boom in production has been the wars of the past few years. They have been remote and the majority of people haven't troubled about their existence but they have been very costly affairs and have consumed much of the world's goods. The Transvaal war was a mighty expensive thing and the replacement of material destroyed meant work for thousands. Ships withdrawn from trade had to be replaced by others and the great non-producing forces of the army had to be fed, clothed, equipped and armed by the labor of others. The same is true of the Spanish-American war and its attendant troop of evils in the orient; and the same is true of the international designs upon China. But the wars are over. The ships are being returned to commerce and the men to the farm and factory. Already there are portents of a return to normal conditions. The railways are not as congested as they were; freight is getting the right of way; the production of coke is on speaking terms with its consumption, and the prodigious increase in the world's ability to create is fast overtaking the demand for products. The let-up must come. When it does come those enterprises which have a reason for their existence and which are solidly based will survive; but those of a fictitious foundation will come down like all houses that are built upon the sands; those which are over-capitalized will run rivers of water; those men who have few investments and guard them closely will retain their gains; but those who have put their money and not their time into combinations and who have a dozen irons in the fire will find their withers wrung.

A side launch is of rare occurrence on the Atlantic seaboard and considerable interest therefore attended the launch in that manner of the tank barge *Pittsburg* at Gibson's point, Philadelphia, on Saturday last. The vessel was built by the Riter Conley Co. of Pittsburg for the Sun Oil Co. She is 176 ft. over all, 32 ft. beam and 12½ ft. depth and will carry 300,000 gallons of oil in bulk. She is to carry Texas oil up the coast to Philadelphia. The vessel was christened by Miss Winnie Jordan, daughter of O. C. Jordan, general foreman.

Bids were opened Monday by the American Coke & Gas Construction Co., Philadelphia, for the construction of a steel tank barge for oil in bulk. The award was not to be announced for a day or two. The vessel is to be 193½ ft. over all, 185 ft. keel, 33 ft. beam and 17 ft. depth, with capacity for 344,000 gallons of oil.



## PHILADELPHIA SHIPPING NEWS.

Philadelphia, May 20.—The steamship Ligonier, built at the New York Ship Building Co.'s yards for the J. M. Guffey Petroleum Co. of Pittsburg, was given her trial trip on Thursday last. She was commanded by Capt. William G. Randle, and on board were members of the Guffey company and Capt. Johnson, who will command the vessel for the owners. The Ligonier developed a speed of 12 knots over the measured mile with all her tanks filled and at 20 ft. draught. This is 2 knots in excess of contract speed. The vessel has been accepted and has left for Port Arthur, Texas. The sister ship of the Ligonier, the Larimer, was launched last Saturday afternoon at the yards of the New York Ship Building Co. Col. Guffey and officials of the Guffey company were present. Miss Sarah Lucille Mellon of Pittsburg christened the vessel. The Larimer has been built with the same quick dispatch as her sister ship. Her keel was laid on Nov. 19 last, and boilers and engines are all on board and ready for operation. The vessel's dimensions are: Length, 360 ft.; breadth, 46 ft. 3 in.; depth, 27 ft. 4 in., with a dead-weight carrying capacity of about 1,580,000 gallons. She has been built to take the highest class in Lloyds' register as an oil-carrying and oil-burning steamer, under the special supervision of the society's surveyors. Triple-expansion machinery has been fitted by the builders, steam being supplied by two single-ended marine boilers at a pressure of 200 lbs. per square inch. The machinery is located at the after end of the vessel. The oil tanks extend before this and are sub-divided into seven cargo-oil and one fuel-oil compartments. The vessel is further sub-divided by an oil-tight centre-line bulkhead extending to the top of the expansion trunk between the main and spar decks. The living quarters are all contained within erections on the spar deck, crew forward, officers amidship and engineers aft. This vessel is the sixth to be built or adapted for oil carrying by the New York Ship Building Co. for the Guffey Petroleum Co. The work of completing the Larimer will be pushed and when done she will go into service the same as the Ligonier.

In a lecture to students and faculty last week at the University of Pennsylvania, Charles H. Cramp, president of the Wm. Cramp & Sons' Ship & Engine Building Co., spoke on "The Condition and Prospects of the Ship Building Industry in the United States." In part he said: "In one respect the great Morgan ship combine rendered a good service to England, for it awakened that country from its lethargy and England is now aware that the United States has outstripped her, and she is doing her utmost to regain her former supremacy as mistress of the seas. Germany is making giant strides in the ship building field, and is gradually working her way to a foremost position. While England is resting on her oars, confident in her former strength, Germany is building and forming a splendid merchant marine and passenger service. Goldwin Smith was right in saying that England has reached her climax because she has almost exhausted her coal and iron supply. Complete exhaustion was delayed because of discoveries of new processes, yet one thing is true, England as an iron and steel country has been relegated by the United States to a subordinate position. Germany's great advance in the shipbuilding industry is due largely to the personality and energy of Emperor William, who has done more for Germany in the arts and the sciences than any other monarch.

"The reason for the comparatively subordinate position of the United States until recent years has been high wages demanded by American workmen, a high tariff on raw products and a reluctance on the part of the government to grant subsidies."

President Henry G. Morse of the New York Ship Building Co. was banquetted by the officials of the ship yards upon his return from Europe a few days ago. Mr. Morse's return has resulted in renewed activity at the yards and it is predicted that within a short time the old Gloucester Iron Works, recently acquired by the ship building company, will be either rebuilt or thoroughly repaired and used as molding and machine works. It is expected President Morse will soon send out notice that the ship yards will run both day and night. At present only a day force is employed and when the night turn is put on the force of employes will be greatly augmented if not doubled.

Supervising Inspector-General George Uhler of the Steamboat inspection service has temporarily appointed H. M. Powers, formerly the first officer of the St. Louis, assistant inspector of hulls, and Clement A. Matson of Wenonah, N. J., assistant inspector of boilers, at Philadelphia. If the men named pass their examination next month the appointments will be made permanent. Increase in the business of the port of Philadelphia made the appointments necessary.

Civil service examinations will be held at Wilmington, Del., June 9 and 10 for the position of assistant inspector of boilers in the United States steamboat service and on June 16 and 17 for the position of assistant inspector of hulls, in the same service.

The launch of the Ericsson company's new steamship, Lord Baltimore, a sister ship of the Penn, has been postponed to May 23. Work on the vessel at the Wilmington yards of the Harlan & Hollingsworth Co. has been delayed by labor troubles.

Stockholders of the Wm. Cramp & Sons' Ship & Engine Building Co. will hold a special meeting June 25 to formally act on the proposition to increase the capital from \$5,000,000 to \$6,250,000, and the mortgage debt from \$1,800,000 to \$7,500,000. The annual meeting will take place on May 28. Notices of the meetings have been sent out, accompanied by a statement of

Charles H. Cramp, president of the company, bearing upon the financial plan.

Rear Admiral Charles E. Clark, commanding officer of the Naval Home, Philadelphia, recently received a handsome sword, suitably engraved, from the people of Oregon, as a token of appreciation of his services while commanding the battleship Oregon. Mrs. Clark was presented with a handsome silver tea set.

At the twelfth annual meeting of the Philadelphia Bourse stockholders, held a few days ago, the following named directors were elected to serve three years: George E. Bartol, Frederick Schoff, William R. Tucker, John C. Dawson, William Supplee, Mahlon N. Kline and William H. Arrott. The treasurer's report gave a cash balance in bank Dec. 31, 1902, of \$196,203.70.

Protests of maritime exchanges and marine men generally against Secretary Moody's order placing civilians instead of naval officers in charge of hydrographic offices are apt to bear fruit in having the naval officers retained. Assistant Darling ordered that until the return to Washington of Secretary Moody no steps be taken to carry the order into effect.

Imports for April, 1903, at the port of Philadelphia, were \$5,004,411, an increase of \$733,376 as compared with April, 1902. Exports, \$6,155,091, a decrease of \$1,297,322 as compared with April, 1902.

Under instructions from Washington recruiting in the navy has been suspended at the League Island yard. Overcrowding of the men on the government's receiving ships led to the suspension. The enlisted force of the navy is within 2,100 of the maximum allowed by law, 31,000.

Five tugs, the Sweepstakes, Waltham, Carlisle, Spartan and No. 2 of the Standard Oil fleet, towed over two miles of barges up the Delaware river a day or two ago and formed an imposing nautical procession.

Arthur Bruce, secretary of the American Steam & Sail Chartering Co., Ltd., of Philadelphia was a New York visitor last week on business connected with the company.

Hiram Walkers' Sons of Trenton, N. J., have an attractive exhibit of their marine railways, yachts and launches in the machinery exposition of the Philadelphia Bourse.

Several of the Delaware river ship yards are awaiting with expectancy the giving out of two gunboat contracts at Washington, Tuesday, May 19.

May 22 is the date set for the award of contracts by the government for improvements to the Delaware river channel.

"Business in furnishing expanded metal clothes lockers for the navy department and for steamships has steadily increased with us," said Mr. Pierce, one of the managers with Merritt & Co., the metal manufacturers of Philadelphia. As a matter of fact their patent lockers have been placed in a large number of new vessels lately launched on the Delaware.

The Capilar Filter Co., manufacturers of a patent oil filter, with offices at 138 South Fourth street, Philadelphia, has increased its facilities at the factory at Camden, N. J., for manufacturing that useful article. Referring to the usefulness of the filter on vessels, William S. Haines of the company said last Monday: "It is the only filter that is really fitted for service on vessels, for no matter how much the ship rocks and splashes, the filter will continue its work." The company will equip the Cambria Iron Works with these filters. The Capilar filter was formerly known as the Peoria filter; later, as the Hanover, and upon being improved and exploited by the Capilar Co., was called by that name. Recent testimonials as to the merits of this device have been received from the Diamond Ice Co. of Wilmington, Del., and the Tidewater Steel Co. of Chester, Pa.

Manager A. H. Dougherty, of the Automatic Incandescent Light Co. with offices in the Bourse building, Philadelphia, reports that his company furnished a sample light, per request, to the Townsend & Downey Ship Building Co., Shooters' Island, New York. The light has given the best of satisfaction and next fall it is the intention of the ship building company named to place twenty-five or thirty of the lights in and about the plant. The Automatic company's light, which is of 1,000 candle power, costs six cents an hour to operate and is especially suitable along wharves, piers and in and about ships in course of construction.

Mr. F. L. Tompkins, manager of the Philadelphia branch of the New York Belting Co., reports that trade has been unusually brisk for some time and he has been supplying the local ship yards with not only belting but rubber goods and other supplies.

## SHIP BUILDING IN SAN FRANCISCO.

San Francisco, Cal., May 20.—At the yard of the Union Iron Works the frames for the protected decks of the armored cruisers California and South Dakota are in place and most of the plating has been done. The battleship Ohio, it is expected, will be completed within the next eight months. The United States monitor Wyoming has completed her forty-eight hour trial. Capt. Cottman, her commander, said: "Everything worked satisfactorily. Ship, engines and guns are all right."

The side-wheel steamer Ramona, building at John Dickie's yard, Oakland, Cal., for the Coronado Beach Co., was launched last week. She is 130 ft. long, 29 ft. beam and 13 ft. 9 in. deep. Engines for this vessel are being built at the Risdon Iron Works.

Hitchings & Joyce, Hoquaim, Wash., have just laid the keel for a tug of the following dimensions: Keel, 66 ft.; beam, 13 ft.; draught, 6 ft.



### STRIKE OF CLYDE MACHINISTS.

Glasgow, May 10.—The unrest with regard to wages in the ship building trade, to which I referred in last letter, has developed into serious trouble. The recommendations of the conference of executive councils of the Employers' Federation and the Allied Trade Unions, which for shortness I will call the executive board, were not only rejected by the machinists in the north east of England and Clyde districts, but the men declared by ballot that they would strike rather than accept the reductions proposed. The proportion in favor of a strike was more than two to one, but the total vote was only a small proportion of the membership of the Amalgamated Society of Engineers in these districts, and it is said that the voting was all done by the young and unmarried members, who doubtless fancy that a few weeks' idleness in the spring and summer weather at £1 per week strike pay will be rather a pleasant holiday. The older members with wives and families think differently, and the strike pay is not quite a certainty. For, in not resuming work on May 1 at the reduced rates, in accordance with the arrangement made by the executive officials of their society, the men were guilty of rebellion against their union and cannot insist on strike pay if the executive decline to pay it. And the trade union executive have been placed in a very awkward and humiliating position by the action of the men. It was they who proposed the terms which the executive board recommended both parties to accept and which the employers did accept. This executive board conference met in terms of the "Conditions of Management" arranged at the conclusion of the strike of 1898. As a provision for avoiding disputes it was laid down that in the event of a local association of employers not being able to arrange a difference with the local representatives of the trade union, reference should be made to a conference of the chief executive bodies, and that there should be no cessation of work pending the reference. But this executive board has only conciliatory functions. It can recommend a course of action to be followed, but it cannot enforce its recommendations. In the present case the recommendations endorsed by the joint board were those proposed by the representatives of the men, and yet they were rejected by the men. The executive board can do no more, it seems, in the present case, but the employers in the district concerned responded promptly to the request of the officials of the Amalgamated Society of Engineers for another conference.

Unfortunately, however, the men instead of continuing work while the matter was being re-discussed—or some of them—went on strike, and of course the employers would not hold a conference of the character proposed with strikers. Thus, a deadlock has been created and also a serious difficulty in the ranks of the Amalgamated Society of Engineers. It is that society alone, I may say, that is concerned at present. The Steam Engine Makers Society is one of the branches of the Allied Trade Unions included in the deliberation of the executive board, but they accepted the recommendations of the board and are at work. The Machine Workers' Society was also concerned, but there are no appreciable number of members of that society at work in this district. Here those machine workers who are not in the Amalgamated Society of Engineers are non-union men. The dispute, then, is an Amalgamated Society affair, and that society is now very rich. But the executive council of the society objects very strongly to the Clyde men for going on strike in the circumstances, and the general secretary, Mr. G. S. Barnes, has been here endeavoring to talk them into reason. All the machinists as far down the river as Clydebank have been out, but they are working at Greenock, Paisley and a few other points. Whether the trouble will or will not develop into a general engineer's strike cannot be said at present.

But naturally it is making ship builders anxious as to the future of the industry. Already it is hinted that the admiralty has paused in consideration of Clyde firms for such of the new naval programme as has to be placed this year. Remembering the delays caused to naval contracts by the strike of 1897-8, they will not again place contracts where there are indications of recurrence of such delays. The Clyde machinists will thus be doing themselves and their industry an immense injury if they persist in their present attitude. On the other hand, the employers cannot withdraw the reductions because they are bound in honor to the other workers in the ship yards who accepted them. The understanding was that wages were to be reduced all round so as to bring down the labor cost of production of new ships to a point that would again attract buyers. To give way to the engineers would involve a raising again of all the wages in the "black squad" and the "white squad," etc.

There has been hitherto no revival in the demand for new ships; that is to say, the new contracts do not even balance the launches. In April, for instance, Scotch ship builders launched twenty-one vessels of 37,420 tons, but booked new orders only to the extent of 30,000 tons. Most of these new orders were in a set of vessels for the China Steam Navigation Co., and of coasting boats for the United Kingdom, only about 10,000 tons being in cargo boats for foreign, colonial and British owners. According to Lloyd's there were only 426 merchant vessels of 974,686 tons under construction in British ship yards at the beginning of April, as compared with 431 vessels of 1,240,344 tons at the corresponding period of last year. These figures do not include warships nor vessels (unless classed) under 100 tons. But they are not figures to induce any workers in the ship building industry to strike. And they serve to remind one that there is no record of

a successful strike against a reduction of wages in a declining condition of industry.

This trouble with the men is doubly regrettable just now, for cheaper material is coming within sight. There has been such a heavy drop in pig iron warrants within the last few weeks that makers' prices will have to follow, and with cheaper crude iron, plates and structural steel will also be lowered, though quotations are so far maintained.

### BIG FUNDS OF LABOR ORGANIZATIONS.

Glasgow, May 11.—In connection with the strike of machinists in the ship yards on the Clyde and on the northeast coast of England it is interesting to note that the Amalgamated Society of Engineers, with which they are affiliated, has a total membership of 93,232, as compared with 90,943 a year ago. There have been, however, 4,988 exclusions and 1,165 deaths in the society during the twelve months. The income for the year ended Dec. 31 last was £353,412 and the expenditure £299,400, comparing with £346,462 and £260,635 respectively in the previous year. The donation benefit to out-of-work members was £87,029 in 1902 as compared with £57,167 in 1901. The fund, or capital of the society, was at the close of 1902 as much as £546,367.

The executive of the Society of Boilermakers & Iron & Steel Ship Builders (this is another organization that may be involved in the trouble) report that last year began with and was characterized by a falling off in trade. There were 2,658 members out of work in January and by the end of December the number had increased to 6,353. The membership is now 48,370, an increase on the year of 257, and the balance, or capital, at the end of the year was increased by £17,914, to £415,088. The year's income was £185,180 and the year's expenditure £167,266, the latter including £56,814 paid to unemployed members, a large item comparing with £24,840 in the previous year.

It is interesting to note that these two great trade unions have between them about a million sterling of accumulated funds.

### NAVAL ARCHITECTS TO MEET IN IRELAND.

Secretary R. W. Dana of the Institution of Naval Architects announces that it has been decided to hold the summer meeting this year in Ireland during the last week of June. This is in response to invitations from Sir Daniel Dixon, lord mayor of Belfast, and from Mr. J. H. Ryan, president of the Institution of Civil Engineers in Ireland. It is proposed to spend the two first days (Tuesday and Wednesday, June 23 and 24) in Belfast, and the two last days (Thursday and Friday, June 25 and 26) in Dublin, the journey from Belfast to Dublin taking place by special train on the morning of Thursday, June 25. The Earl of Glasgow, president of the Institution of Naval Architects, will occupy the chair, and strong local reception committees are being formed in Belfast and Dublin to represent those cities and the various corporate bodies and institutions of the districts. Particulars of the papers to be read, of the visits to works, and of the excursions and entertainments which are being arranged will be furnished later to members of the institution who signify their intention of taking part in the meetings. The Earl of Dudley, lord lieutenant of Ireland, has invited the members of the institution and the ladies who will accompany them to a garden party at the Vice-Regal Lodge during their visit to Dublin, and offers of entertainments have been made by the lord mayors of Dublin and of Belfast, the chairman of the Belfast harbor commissioners, the Hon. W. J. Pirrie, and others. Messrs. Harland & Wolff and Messrs. Workman & Clark have promised to throw open their works for the inspection of members during the visit to Belfast.

### TONNAGE OF SUEZ CANAL.

The following statement, showing the number and tonnage of vessels of various nationalities passing through the Suez canal last year as compared with 1900 and 1901, is taken from the bulletin of the Suez Canal Co.:

Country.	1900.		1901.		1902.	
	Ships.	Gross tonnage.	Ships.	Gross tonnage.	Ships.	Gross tonnage.
United Kingdom	1,935	7,771,847	2,075	8,651,015	2,165	9,333,996
Germany	462	2,047,230	511	2,452,423	480	2,371,046
France	285	1,167,987	281	1,158,077	274	1,174,036
Netherlands	232	704,458	230	709,548	218	727,943
Austria-Hungary	126	467,605	138	555,065	139	569,345
Russia	100	451,152	129	537,035	110	472,946
Japan	63	351,854	57	334,553	61	331,562
Italy	82	247,167	87	268,329	85	252,091
Spain	34	153,248	35	155,974	30	133,157
Norway	30	90,205	47	102,796	41	100,730
Denmark	27	97,240	20	76,178	14	55,702
Ottoman Empire	28	43,125	40	67,871	38	57,863
United States	22	78,314	25	65,923	21	67,996
Greece	2	214	6	11,617	14	25,370
Belgium	7	16,895	4	7,036	..	..
Portugal	3	6,424	6	4,339	3	4,306
Sweden	2	2,996	4	2,729	7	8,284
Argentina	1	1,777	1	1,777	..	..
Siam	..	..	1	521	2	1,172
Sarawak	..	..	1	365	..	..
Egyptian	..	..	1	62	6	6,274
Totals	3,441	13,699,238	3,699	15,163,233	3,708	15,694,35

It is reported that John D. Rockefeller and George J. Gould have bought a controlling interest in the Colorado Fuel & Iron Co.



## INTERVIEW WITH JOHN D. ROCKEFELLER.

A series of articles now running in McClure's Magazine upon the history of the Standard Oil Co. has attracted considerable attention. It is not likely that any notice will be taken of them by the Standard Oil Co. itself, but a conversation between Mr. John D. Rockefeller and Mr. Gaylord Wilshire at an accidental meeting has been published in Wilshire's Magazine and is repeated herewith for what it may be worth.

'Last March, while on my way from Los Angeles to San Francisco, I had occasion to stop over a few days at Santa Barbara,' says H. Gaylord Wilshire in Wilshire's Magazine. 'Just at that time John D. Rockefeller had also showed his good judgment in picking out Santa Barbara to get his needed 'rest.' Mr. Rockefeller, I may say in the first place, was not by any means the physical wreck that some people like to make him out. I sat at the next table to him, and can vouch for the strength and variety of his appetite. His color was good, and he looked a fairly healthy man for his age, sixty-four, with the exception that he had lost every spear of hair from his head and face. He was most affable and approachable to every one, and seemed to make a point of going the rounds every day with a glad hand out for every one. His interest in life seemed to be centred on the game of golf. Knowin' that his nervous system was so wrecked that he would not care to burden his mind with anything strenuous, I really felt conscience stricken in ever departing from the subject of the weather and golf in my talks with him. However, one day I did bring up the subject of trusts.'

'He listened with interest to my exposition of the socialist philosophy regarding monopoly and said: 'Well, Mr. Wilshire, I can't speak as to other trusts, but certainly as far as the Standard is concerned overproduction of oil led to the formation of the trust. We were producing three times as much oil as could be sold, and the trade was in a very bad way. The trust resulted in the greatest benefit to the refiners, and at the same time the general public were also benefited by getting lower prices.'

'Mr. Rockefeller inquired if I had read the articles by Miss Tarbell upon the Standard Oil trust now running in McClure's Magazine. 'All without foundation,' he said; 'the idea of the Standard forcing any one to sell his refinery to it is absurd. The refiners wanted to sell to us, and nobody that has sold and worked with us but has made money and is glad he did so.'

'Now you, Mr. Wilshire, are personally acquainted with so and so (mentioning men, our mutual friends, interested in the trust), and you know that such honorable men would not do anything maliciously to injure any one. You know they all did well by coming into the trust. I can tell you that every one else has done well that came in with us. It's absurd to say the Standard forced the refiners into the trust. They were only too glad to come in, and they all made money by coming in. Natural conditions would have ruined us all if we had not formed a combination. 'I thought once of having an answer made to the McClure articles,' continued Mr. Rockefeller, 'but you know it has always been the policy of the Standard to keep silent under attack and let our acts speak for themselves, and I suppose it is the best policy for us to continue upon that line, don't you, Mr. Wilshire?'

'I was quite overcome with confusion at having the richest man in the world seek the advice of a socialist upon a question of personal conduct, and could do no more than blurt out a general assent to his position.'

'Don't you think, Mr. Rockefeller,' said I, 'that since the trust is, according to your own theory, a result of overproduction, it means we are approaching a time when the general stoppage of this unnecessary production by the trusts will have a tendency to create an unemployed problem?'

'No,' said Mr. Rockefeller, 'I think the trust, by regulating industry and systematizing business, will help keep up this present prosperity. We have never had such a period in the history of the country before, and yet there never were so many trusts, hence it cannot be said that trusts prevent prosperity. There are less unemployed men than ever known in the history of the country. And, anyway, since we are both agreed that an anti-trust law is absurd, since it is attempting to prevent the consequences of overproduction, how would you propose to solve the trust problem?'

'Yes, Mr. Rockefeller, I am as much aware of the futility of anti-trust laws as you are. The socialist remedy for the trust is government ownership.'

'Do you think the government could run the Standard as well as we run it?' asked Mr. Rockefeller.

'I would not be positive that the state could run the trusts any better than you and Mr. Morgan do, speaking from the standpoint of industrial efficiency, but government ownership is a necessary basis for the operation of the co-operative wage system which must supersede the present competitive system to allow us to escape an unemployed problem, which is simply the result of competition among laborers, forcing wages down so low that the laborer cannot buy what he produces.'

'But we have no unemployed question. We never had such a demand for labor before,' returned Mr. Rockefeller.

'Yes, that is true,' said I, 'but I am looking into the future, and I can see an inevitable unemployed problem looming up there. The trust is meeting a present emergency, but it is only a temporary stopgap, and it is not in the least going to be able to solve the unemployed problem of the future.'

'Well, Mr. Wilshire, I am not looking ahead so far as you are. Business is to-day good, and I think it will continue so. If

it does not, then we must let the future settle its own problems.'

## MANCHESTER AS A PORT.

Manchester as a port, according to the latest statistics compiled, does not appear to be satisfactory. The comparative position of Manchester was last year set forth for the Manchester Chamber of Commerce by Mr. Marshall Stevens. He has now collected the figures for 1902. Dealing first with imports and exports, Manchester is sixth in the list of ports with imports and exports in 1902 to the value of nearly £25,000,000, an increase of about £2,500,000 over 1901. Above her stand London, £261,000,000; Liverpool, £232,000,000; Hull, £51,800,000; Glasgow, £32,500,000, and Southampton, £32,000,000, both the latter showing increases. On the other hand London, Liverpool, Hull and Cardiff show decreases of about a million each, Liverpool's decrease of 1,340,000 being the greatest. Whilst Manchester has been working up an import and export business of £20,000,000, Liverpool has increased hers by more than £50,000,000, and London by £40,000,000, Manchester does not yet do 10 per cent. in amount of the London trade, and only about 11 per cent. of that of Liverpool. In stating the commercial case in parliament, Mr. Stevens assumed with regard to the ship canal, that the canal could rely upon the normal increment of Liverpool. In that case the figures for 1902 would have amounted to about £60,000,000. Taking imports alone Manchester stands fifth, as last year, with imports to the value of £17,620,000. Harwich is next above with £20,000,000, Hull next with £33,000,000, and then Liverpool and London, with £127,250,000 and £167,500,000 respectively.

It is satisfactory, however, to note that the increase of Manchester's imports last year was £2,719,571, and greater than that of any other port. At Liverpool there was a decrease of £4,358,000, and in London of nearly £2,000,000. It will be news to some, all the same, that the value of Manchester's imports is considerably more than those of Southampton, Glasgow, Leith and Bristol. By reason of the falling off in the value of exports of the Tyne ports, Manchester gains a place, and is eighth upon the list, with exports to the value of £8,000,000, but only with an increase of £72,000, whilst London and Glasgow increased more than £2,500,000, Southampton £2,225,000, and Liverpool £1,000,000. During the second, third, fourth and fifth years of the port's history Manchester obtained the seventh position in value or exports, and it is deplorable that last year less exports (in value) left the port than in the early years of 1895 and 1896, whilst during the same period the increase in exports from Liverpool has been greater than the total export of Manchester. Liverpool is top of the list with £91,181,000.

In total tonnage from the twentieth position in the list of ports in 1901, Manchester has risen to the eighteenth in 1902, displacing Leith and Portsmouth, but Bristol, which was passed in 1900, and which got ahead again in 1901, keeps her lead, although only by about 9,000 tons. In steam tonnage Manchester has advanced from the 15th position in 1900 and 1901 to the 10th for 1902, with an increase for the year of 154,000 tons, the ports overhauled being Middlesbrough, Newport, Grimsby, and Blvth. It is regrettable that the coastwise trade of Manchester did not assume anything approaching the tonnage the port is entitled to. Manchester is still only twenty-second on the list, with an increase for the year of 73,000 tons, an increase which is beaten by no fewer than ten ports, Cardiff's figures being more than 500,000 tons increase over 1901, whilst all the ten excepting Liverpool show increases of more than 100,000 tons. Manchester's total is 607,200, Liverpool's over 3,000,000. In comparing the coastwise figures of other ports with Manchester, Mr. Stevens remarks that last year he was met with the criticism that having regard to the fact that Manchester is not a passenger port, it was not fair to compare its tonnage figures with ports like Glasgow, where in the coastwise trade there is a great deal of purely passenger steamer business. However, Manchester's weak position is not improved by the analysis. Manchester's weak point, it appears, is her failure to obtain her proportion of the Irish trade. There are no fewer than ten ports with a larger trade to Ireland than she has. The total inward steamship cargo from Ireland in 1901 was only 94,000 tons. Mr. Stevens' tables contain voluminous and really interesting details of the articles and quantities of the imports. Wheat has increased from 222,000 tons as compared with 143,000 in 1901. The year's import of cotton, however, was not a record, as might have been expected. In 1900 the import was 143,870 tons, in 1901 it was 118,648, and in 1902 it was 139,751 tons. The import of bananas was 367,070 bunches in five months, and 23,000 tons of oranges is a big figure. Onions, apples, and grapes show an increase. A serious need at the port appears to be seed-crushing mills, as the 9,330 tons of cottonseed imported had all to be taken out of the canal to be crushed. For the same reason the port receives no portion of the large imports of linseed and other oil-containing seeds and nuts. Iron and sugar fell off considerably, but records were established in timber, petroleum—29,733,000 gallons—farinaceous substances for manufacturing purposes, and paper. Dyestuffs, wool, flax, hemp and jute, and other articles show a poor appreciation of the port, but paper-making materials give the respectable figure of over 123,000 tons. In conclusion, Mr. Stevens says, "The year's progress of the port is disappointing. If Manchester were an old port, the progress obtained during the year might have been considered as very satisfactory, but when it is remembered that we have not yet reached anything like the normal conditions which our geographical situation justifies, the figures generally are deplorable."



# NEWS OF THE GREAT LAKES



## LAKE FREIGHT MATTERS.

The independent vessel owner of the lakes is just now inclined to feel that the so-called trusts, the big industrial organizations—the United States Steel Corporation and the Pittsburgh Coal Co. in which he is especially interested—are not combinations of capital that have thus far displayed policies antagonistic to his interests. Whatever may be said to the contrary, it is a fact that the majority of vessel owners have felt that the Steel Corporation, in view of all the conditions pertaining to the present season's business, displayed a very liberal spirit in establishing contract ore freights on a basis of 85 cents from the head of the lakes, and that the same is true of the 40-cent coal freight to Lake Superior with 50 cents to Milwaukee and other ports on Lake Michigan where the conditions are about the same as at Milwaukee. But what is especially satisfactory to the vessel owner is the disposition on the part of the big organizations to maintain the contract rates on single-trip charters, just as they did a year ago. In the past, when there were twenty or twenty-five different interests in ore and coal shipping lines there was nothing like the stability to the "wild" freight market, as it is called, that there is now, and there was more of what might be called news in the changes from week to week, or from day to day, than there is at present. Just now, for instance, there are probably more vessels than are needed in the Escanaba ore trade, but the smaller shipping interests do not rush to cutting the rate for fear of what course the Steel Corporation might follow under such a condition; and so the vessel owner is thankful and there is little of interest in the freight market. Viewing the situation generally, it may be said, therefore, that with a continuance of the present general prosperous business conditions the vessel owner may expect some fairly profitable freights before the season is at an end on anything that he has free to take advantage of single-trip charters, but in event of a lower plane of values in all lines he must expect to share in the depression; and so the lake freight market is a quandry, even to those best posted regarding it.

## LAKE SHIP YARD MATTERS.

When the American Ship Building Co. was organized about three years ago, taking over every American plant on the lakes capable of building a steel vessel excepting the Craig works at Toledo, its future was mistrusted because of the great increase that had already been made in the lake fleet. "There must be an end to this building of ships, was the comment heard then and heard many times since, but the big organization has turned out more vessels in the past two years than had been built in any four previous years, while two or three competitors other than the Craig company have built up new yards on a moderate scale and have found as much work as they can care for through the present year, with considerable figuring going on for 1904. Work on the latest of the new yards, that of the Great Lakes Engineering Works at Detroit, has assumed proportions that give indication of what it is to be like. It will certainly be a very fine plant, modern in every respect and built in a most substantial way. From the scale on which the work has been undertaken, it is quite probable that the new Detroit yard will attract as much attention from a lake standpoint as has been given to the yards of the New York Ship Building Co. and the Fore River Ship & Engine Co. on the Atlantic seaboard. It is understood that the management hopes to be able to put down a keel some time in July but they are saying nothing on that score in view of the delays that have been encountered with all new structural enterprises of late. The Great Lakes works recently issued a very attractive catalogue dealing with the business of their machinery plant, which was the old Hodge works at Detroit, and which they were operating for some time previous to beginning work on the new shipyard. Pictures of different types of lake vessels that were engined at these Detroit works, together with reference to jobs lately executed, show that the new organization is not at all unfamiliar with marine engineering.

It is again announced that the Manitowoc Dry Dock Co. of Chicago and Manitowoc, Wis., has arrangements about completed for the construction of a large dry dock at its Manitowoc works—a dock costing about \$80,000 and capable of accommodating the Lake Michigan car ferries. The dimensions contemplated are 450 ft. length, 60 ft. width and 18 ft. over miter sill. It is figured that in addition to the regular Lake Michigan business the new dock would attract patronage on account of its proximity to the Sault and to the Straits of Mackinaw, where a great many accidents occur. The Manitowoc company is figuring on contracts for a couple of passenger steamers, one of 225 ft. length for Seymour Bros. of the Northern Michigan Trans-

portation Co. and the other a smaller vessel for Michigan City parties.

W. J. Wood, naval architect of Chicago, has entered into an arrangement with the Indiana Transportation Co. to furnish plans for a screw passenger steamer of the day excursion type capable of making three round trips daily between Chicago and Michigan City, on which route the Indiana company is now operating the steamer Mary. The new boat will be large enough to carry 1,000 to 1,200 passengers, will have twelve to fifteen state-rooms and will cost between \$100,000 and \$125,000. Her dimensions are to be 180 to 200 ft. on keel, with 34 or 35 ft. beam. In order to cover the forty miles of distance six times daily she must be built to go 20 miles an hour. The completion of several municipal and government works and the addition of numerous interurban and the Pere Marquette railway systems during the present summer vastly increases the importance of Michigan City as a point of interest to visitors from Chicago and tourists in general.

Thomas Marks & Co. of Port Arthur, Ont., have placed an order with Armstrong, Whitworth & Co. of Newcastle, England, for a freight steamer for Canadian lake trade. Dimensions are to be 256 ft. over all, 42 ft. beam and 25 ft. depth. She will have triple expansion engines with cylinders of 19, 31 and 52 in. by 36 in. stroke. Steam will be furnished by two Scotch boilers, 13½ ft. in diameter and 10 ft. long, to be allowed 180 lbs. pressure. It is expected that the vessel will be ready for lake service about the middle of September next, that she will carry 2,000 tons of freight on 14 ft. draught and have a speed of about 10 knots. She will be built under the rules of the British Corporation.

Another of the six large steamers ordered eight or ten months ago by the late Capt. W. W. Brown of Cleveland for the United States Transportation Co. was launched at the Lorain works of the American Ship Building Co. Saturday and named B. Lyman Smith. These steamers are of 5,250 to 6,200 gross tons capacity. Messrs. Horace Wilkinson and B. Lyman Smith of Syracuse, N. Y., who are among the principal stockholders of the United States company, were in attendance at the launch and were accompanied by a party of friends from Syracuse. The new steamer will be completed in about a month and will be sailed by Capt. Boyer.

On Saturday next the American Ship Building Co. will launch at its West Bay City yard one of the three large steamers—6,200 tons' capacity—which have been under way for some time past for G. A. Tomlinson of Duluth, and on the same day another of the ten steamers for the St. Lawrence trade of the Wolvin syndicate (Great Lakes & St. Lawrence Transportation Co.) will be launched at the Superior yard. The Tomlinson steamer is 136 ft. over all and of 6,200 gross tons capacity and the Wolvin syndicate steamer of regulation Canadian canal size—255 ft. over all, 241 ft. keel, 41 ft. beam and 18 ft. depth.

Plans are being prepared by the Columbia Iron Works for the construction of a dry dock at its works at St. Clair, Mich. The dimensions of the new dock will be: Length, 550 ft.; width, 80 ft.; depth over miter sill, 20 ft. The company desires to be in position to make repairs to the largest vessels.

During the past week Capt. George A. White of the Hudson River Day Line had a conference with Mr. Frank E. Kirby relative to designing a new side-wheel steamer for the New York-Albany route. The new steamer is to be 380 ft. long over all and 42 ft. beam. Her breadth over guards will be 82 ft.

A steel lightship of 75 ft. length and 21½ ft. beam is to be built by the Ship Owners' Dry Dock Co. of Chicago for the United States government. She is to be stationed on Peshtigo reef.

A drill boat, built of steel by the Empire Ship Building Co. of Buffalo for the Buffalo Dredging Co. at a cost of about \$10,000, was launched a few days ago.

## HIGH WATER.

Gage records of the United States lake survey show a marked increase this year in the stage of water throughout the lake region. The records show the following mean stage of water above mean sea level for April:

	Stages during April, ft.	Higher than during same month last year, ft.	Higher than during April, 1895, ft.
Lake Superior .....	601.60	0.14	0.15
Lake Michigan .....	579.89	0.40	0.31
Lake Huron .....	579.74	0.29	0.23
Lake Erie .....	573.14	1.56	1.27

The present fall from Lake Huron to Lake Erie 1.27 ft. less than a year ago.



### USING SCRAPERS WITH AUTOMATIC UNLOADERS.

One of the problems of unloading ore from lake vessels is to get the ore directly under the hatch where the clam shells may seize it and hoist it to the dock or cars. This is accomplished in some measure by giving horizontal extension to the clam shell itself but there are always certain parts of the vessel which cannot be reached. Some of the ore therefore has to be shoveled by hand within the radius of action of the clam shell. Usually eight men to a hatch perform this service. Mr. M. Andrews, superintendent of docks for M. A. Hanna & Co., has for some time past been given attention to the problem of minimizing the manual labor involved in this action. He came to the conclusion that an ordinary road scraper could be utilized to bring the ore to the region of the hatch, and on Thursday last a device, evolved by him, was tested at Ashtabula aboard one of the vessels. Ordinary road scrapers were lowered into the hold and operated by means of winches with cable adjusted to the hatch. Two road scrapers were used at each hatch, the motor serving to thrust one out to the ore while it pulled the other in and vice versa. Two men were placed at each scraper and one at the winch, making five men in all, and the performance was regarded as economical, both of time and money, over the old method. Elsewhere will be found in this issue a brief item detailing a new record of unloading by means of the Hulett automatic unloader at Conneaut, and thus is the problem of unloading gradually nearing satisfactory solution. In this case the steamer, the James E. Hoyt, has nineteen hatches and is specially constructed to facilitate unloading. Her cargo was entirely removed by the clam shells but this is the first instance on record of a total cargo being so removed. In the prevailing type of vessel additional assistance is needed, which Mr. Andrews' device appears to render most economically.

### CONSOLIDATED LAKE SUPERIOR REORGANIZATION.

A Philadelphia dispatch concerning the reorganization of the subsidiary companies of the Consolidated Lake Superior Co. is to the effect that Mr. F. H. Clergue has been dropped as a director and as well as an officer from all of them. James Butterworth, although resigning from the directorate of the parent company, retains his place in most of the subsidiary plants. H. A. Berwind, who resigned from the Consolidated Lake Superior board of directors to make way for H. K. McHarg, has been placed on the directorate of every one of the underlying concerns.

The present directors of the Algoma Commercial Co., Ltd., the Algoma Central & Hudson Bay Railway Co., the Algoma Steel Co., Ltd., the International Transit Co., the Lake Superior Power Co., the Manitoulin & North Shore Railway Co., the Michigan Lake Superior Power Co., the Ontario Lake Superior Co., and the Sault Ste. Marie Pulp & Paper Co. are identical as follows: James Butterworth, C. Shields, E. H. Sanborn, H. A. Berwind, Samuel Rea, T. C. Search and James S. Swartz. The directors of the British American Express Co. and the Tagona Water & Light Co. are similar except that the names of Messrs. Butterworth and Swartz are absent from the former and the names of Messrs. Butterworth & Sanborn from the latter.

It is learned officially that the present management of the Consolidated Lake Superior Co. will proceed upon the inference that they own no Bessemer ore. Development work at the Josephine mine, which was alleged by the previous management to contain the Bessemer ingredients, has been stopped pending a series of boring tests which is now under way. It is under contemplation that Bessemer ore will have to be obtained from outside sources and is said that the company will simply go into the market and buy it, as needed, where it can be obtained cheapest. As the company now expects to have their new furnaces in operation July 1, and to start the steel plant later after a supply of Bessemer pig has been produced, arrangements have, of course, been already made for the first supply of Bessemer ore. Should any of the company's iron ore property, in the future, be found to contain ore of Bessemer quality, the management would find itself only the better off for its present policy of banking only on certainties.

### CANADIAN SHIPPING NOTES.

The Dominion Marine Association has secured practically all it asked the government to do in aid of the inland shipping interests. The minister of customs announced, a few days ago, that the government would assume the payment of customs officers for overtime necessitated by the arrival and departure of vessels on holidays and after the regular business hours. The amount involved is about \$70,000 a year. The only matter now remaining unsettled is the question regarding engineers on the minor inland waters.

A further aid to the shipping interests in Canada has been granted by the Dominion government by increasing the subsidy for the construction of dry docks from 2 per cent a year on the cost to 3 per cent for twenty years, the subsidy not to exceed \$30,000 a year. The dry dock at Collingwood, Ont., is being enlarged, and it is considered probable that other docks to accommodate large vessels will be constructed on the great lakes.

Application is being made at the current session of the Dominion parliament for the incorporation of a company to operate a car ferry line between New Brunswick and Prince Edward island.

An endeavor is being made to obtain government support to a proposal to dredge a channel 100 ft. wide and 20 ft. deep from New Glasgow, N. S., to the sea. The river is not at present navigable for anything but very small craft.

The Elder-Dempster and Beaver lines of steamships sailing between Canada and Great Britain will in future be known as the Canadian Pacific Atlantic Line.

Capt. Zealand, of Port Hope, Ont., has been appointed manager of the Port Huron Sarnia Ferry Co.

The Canadian Transportation & Storage Co. is seeking incorporation to own and operate freight and passenger steamers. A. Augstrom, manager of the new ship building yard near Welland, Ont., and DeWitt Carter of Port Colborne, are interested in the project.

The German government is negotiating for the purchase of the Southern Cross and other vessels of the Newfoundland sealing fleet, for the purpose of a relief expedition to the Antarctic ocean.

The steamer Strathcona is being engined at Halifax for the Halifax and Causo Steamship Co. The hull was built at Port Clyde, N. S., and towed to Halifax. The vessel will have accommodations for thirty passengers and about 200 tons of cargo.

The steamer Beatrice S. Waring was launched at Carleton, N. B., a few days ago, for the Springfield Steamship Co. She will go on the Belle Isle route early in June.

It is proposed to convert the 6,000 ton steel barge Agawa, owned by the Algoma Central Ry. Co., into a steamer. The Agawa was built two years ago by the Collingwood Ship Building Co.

### EQUIPPED WITH ORE DISCHARGING APPARATUS.

Writing of "A turret steamer to discharge 10,000 tons of ore in thirty-four hours," a Newcastle correspondent of Fairplay, London, says:

"The turret steamer Grangesberg goes for her trial trip from Sunderland on Saturday. This steamer is a marvel of ingenuity, is the first single-decked steamer built to carry 10,000 tons, and shows what can be done by our local ship builders. She is built to carry 10,300 tons on a draught of 22 ft. 8 in., she will steam 10½ knots, she has fourteen masts, twelve hatches, twenty-four derricks, twelve double-ended winches, and with this gear she will be able to discharge the whole of her 10,000 tons of cargo in about thirty-four hours. Her engines are placed aft, so that at the same time that she is discharging her ore she will be able to take her bunkers from lighters, and thus be ready to sail on another voyage as soon as the last tub of ore is discharged. This steamer has been built by Wm. Doxford & Sons, Ltd., of Sunderland, and is for Messrs. W. H. Muller & Co. of Rotterdam for their ore trade between the Baltic and Rotterdam."

This item is quite interesting as showing a different method of discharging ore than obtains on the lakes. In this case the vessel herself is equipped with the unloading apparatus; on the lakes it is the docks which are so equipped. The discharge of 10,000 tons of ore in thirty-four working hours is good time, but the proportion has been vastly exceeded on the lakes, even though the problem of unloading may still be generally set down as unsolved. Recently the Hulett clamshells at Conneaut discharged 5,217 gross tons of ore from the steamer James H. Hoyt in a trifle under four hours' time. This would mean 10,000 tons in less than eight hours. Of course it must be admitted that such dispatch is unusual, but the fact remains that it has been accomplished.

### MASTERS AND ENGINEERS OF LAKE VESSELS

Lake Shore Saw Mill & Lumber Co., Cleveland: Steamer—E. A. Shores, Jr., Capt. Alfred Forrest, Engr. —. Schooner—Kingfisher, Capt. A. J. Sommerville.

Canada Atlantic Trans. Co., E. J. Chamberlain, Gen. Mgr., Ottawa: Steamers—Geo. N. Orr, Capt. Wm. Baxter, Engr. H. H. Evans; Arthur Orr, Capt. H. Jaenke, Engr. J. Murnan; Ottawa, Capt. A. Birnie, Engr. P. J. Quinn; Kearsarge, Capt. R. McDownen, Engr. H. A. Wood.

The best laid plans of mice and men gang aft alee. When the steamer J. S. Keefe left Buffalo on her maiden trip with a cargo of coal for Duluth the Review mentioned the circumstance and as the vessel had left in ample time to reach Duluth before the day of publication the sentence indicated that she had reached there. But, alas, the Keefe and the whaleback barge No. 130 collided opposite Grosse Point lightship and the Keefe had to put back to Wyandotte to see how badly she was hurt.

Minor misfortunes have attended the Barry Line since it began running on the Detroit-Cleveland route. The Badger State caught fire at her dock at Detroit but the blaze was confined to the officers' quarters and was extinguished with a slight loss by the crew. The Empire State broke her shaft near the outer harbor at Cleveland and had to be towed into port, suffering several days' delay in making repairs.

Messrs. Funch, Edye & Co. of New York, announce with sorrow the death of their senior partner, Mr. Henry W. O. Edye, at Hamburg, Germany, on May 13. The surviving partners will continue the business under the firm name.



## BARGE CANAL PROPOSITION.

Andrew Carnegie Warmly Indorses the Project and Gen. Greene makes a Splendid Address.

An enthusiastic meeting on the 1,000-ton barge canal was held under the auspices of the Merchants' Exchange at the Ellicott club, Buffalo, recently. Several hundred persons of prominence were present. Andrew Carnegie sent a letter warmly endorsing the enlargement of the Erie canal and Gen. Francis V. Greene, police commissioner of New York, made an earnest plea for it. Mr. Carnegie's letter was as follows:

Mr. Leonard Dodge, president Buffalo Merchants' Exchange, Buffalo, N. Y.:—Yours of April 16 received. You do well to honor those who have secured the right to the people of New York to decide whether they are to abandon or improve the waterway which New York state, among all the states, possesses from the lakes to the sea. There never was a time when, in my opinion, it would have been good policy to give up this unique advantage over our sister states upon the Atlantic seaboard, but if ever a day has existed when this would have been wise, the day has come when it would be suicidal. We have today such a community of interest among the leading railway systems, New York Central and Pennsylvania, as to render it more profitable for their interests to divert the traffic from the east to the west to the ports in Pennsylvania, Maryland and Virginia, pushing New York state aside, because these ports give a longer water haul and a shorter rail haul for the traffic than New York state, from its position, is able to do.

Before the day of mergers, New York railroads would compete our traffic against this physical disadvantage. Today it is no longer to their interest to do so. The managing officers of the merger lines naturally send the traffic where it can be handled at the cheapest cost to them, while the loss is made up to the line that might have got a share of the traffic in other ways. With the proposed 1,000-ton barge canal, New York state, New York, Buffalo and other cities along the line and adjacent to it would have cheaper transportation by one half and even in many cases by two-thirds, than without this canal could ever be obtained from railroads. With the canal in operation, of course, the railroads will put down their rates, which otherwise they would maintain.

I have called attention to the fact that the Carnegie Steel Co. has provided for a first expenditure of \$12,000,000 for manufacturing works upon Lake Erie, not far from Buffalo. You see that the Lackawanna Iron & Steel Co. has erected works at Buffalo. The reason why the western part of New York state became such a magnet for attracting capital was, in great part, because of the Erie canal, and the certainty that New York state would never forego the advantages she had over her competitors, but would enlarge that canal at any cost. I expected that the 9-ft. improvement would be secured, and even with that improvement, we had determined to place a line of boats upon it from our works at Conneaut, by which we would have taken the iron and steel throughout New York state and to New York, and thence without trans-shipment to all points in the east.

Believe me, gentlemen, New York state has only to provide a waterway capable of taking 1,000-ton barges through, to meet successfully the threatened triumph of Pennsylvania over her in population. You know that New York state, as a state, excluding Greater New York, has been losing population steadily as compared with Pennsylvania. So it will continue to do, and it is only a question of a few decades when Pennsylvania will be again the Empire state as she once was. The only means that I know of that will retard this, and perhaps prevent it, is to obtain for New York state what Pennsylvania nor any other state can by any possibility acquire—a deep and wide waterway from lake to ocean. The interest upon \$100,000,000 is a mere bagatelle to pay for this. The \$3,000,000 will never be felt against the annual increase of wealth and population. Even if the waterway were operated at cost and yielded no profit, its incidental advantages would give us the largest dividends on record.

ANDREW CARNEGIE.

## GEN. GREENE'S ADDRESS.

Gen. Greene's address was thorough, he saying among many things:

"Those who believe in the commercial supremacy of the state of New York and desire to see it continued may well congratulate themselves that, after so many years of earnest and determined effort and in the face of so many difficulties, the opportunity is now offered to the voters of the state to decide whether an adequate waterway shall be maintained across the state from the lakes to the ocean. Whenever the opportunity has been offered to them the people of the state have always voted in favor of the maintenance and suitable enlargement of the Erie canal; and they have inserted in the constitution a provision that the canals shall not be sold, leased or otherwise disposed of, but shall remain the property of the state and under its management forever. There is every reason to believe that the people will vote in favor of the proposition now to be submitted to them, provided it is properly presented for their consideration. On the other hand it will be vigorously opposed in certain quarters, and to counteract this an active campaign in its favor must be carried on.

"It should be noted, as was clearly pointed out when the

vote was taken in the senate, that the question passed upon by the legislature was: 'Shall this bill pass and ought the same to receive the sanction of the people?' And this question was decided in the affirmative by both branches of the legislature. It is fortunate that it was not a political measure and was not passed by a party vote. The representatives of both houses of the two great cities at the opposite ends of the state voted solidly in favor of it, and with the aid of certain votes from the interior it was passed by a large majority, but there were negative votes from both parties. The question is, therefore, in no sense a partisan one; nor is it directly connected with national, state or municipal politics; it is a question solely of the business prosperity of the state of New York and whether it is wise to borrow a large sum of money for the purpose of enlarging the canal, in the belief that such enlargement will restore to the state a great volume of trade which the railroads have diverted to other states. The estimated cost of the project, as determined by the engineers of the committee of which I had the honor to be chairman in 1899, was \$62,000,000. Certain changes were made in the plans by the state engineer and the advisory board of 1900 by which the dimensions of the canal were increased, and the Oswego canal, with 12 ft. depth, was included in the estimate, and the total cost brought up to \$82,000,000. The increase in the cost of labor and materials during the last two years led to a revision of the engineers' estimates during the last winter, by which they were increased more than \$10,000,000 for labor and materials and to provide against unforeseen contingencies, and by more than \$9,000,000 additional for a 12-ft. depth on Champlain canal and for certain improvements at the Hudson river terminus; thus bringing the total cost up to \$101,000,000; and this is the amount authorized to be raised by the issue of bonds in the bill which will come before the people for their decision in November next.

WILL COST LESS THAN \$101,000,000.

"As to these estimates, I think I may say that everyone who has been connected with them has taken warning by the mistakes made in underestimating the cost of the 9-ft. improvement projected in 1895, and everyone has determined in this case to protect his reputation by being absolutely on the safe side; the estimates in all probability are in excess of what the work would cost under the present prices of labor of materials; but there is every reason to believe that before the proposed enlargement can possibly be completed there will be a very considerable reduction in the prices of labor and materials, and that the work will cost very considerably less than the estimate of \$101,000,000. It is, therefore, perfectly safe to figure on not exceeding \$101,000,000 as the cost of this great improvement.

"This is a great sum, but we live in a great state, of mighty resources, both in population and wealth. It is less than 2 per cent. of the total assessed valuation of the state in 1901, and probably not more than 1¼ per cent. of the real value of the property in the state. It is about equal to the cost of the government of the city of New York for one year; it involves an expenditure about one-third as great relatively to the resources of the state as that which the state incurred when it first undertook the construction of the Erie canal; it is about twice what a single railroad corporation has determined to expend for the privilege of carrying unbroken trains by tunnel into New York and Brooklyn in place of distributing passengers by ferries from the Jersey shore; it is less than the projects to which the city of New York has already committed itself, or shortly will commit itself, to improve the facilities for transportation of passengers within the city limits. While no such vast sum should be wasted in an unwise project, yet if the project be wise and proper, the cost is so easily within the resources of the state that the financial problem need not alarm even the most timid. The total sum, moreover, is not to be raised at a single time. It is to be spread over a term of years and will be obtained from the sale of bonds which will be paid off during a term of fifty years; the total charge for sinking fund and interest at the rate of 3 per cent. being about \$3,900,000 a year. This is, indeed a bagatelle—always provided the expenditure is a wise one—for a state whose citizens own \$6,000,000,000 of property, it amounts to but a fifteenth part of 1 per cent. a year. Finally, the money is not to be raised by direct taxation, but under the wise legislation of the last two legislatures it will be provided by indirect taxation.

## HOW IT WILL IMPROVE COMMERCE.

"The advantages of the enlarged canal are that it will provide a transportation route across this state which, owing to the topography of the country, is impossible across any other state between the lakes and the ocean; on which route the cost of transportation can be reduced to a figure far below that which is now possible or apparently will be possible at any time in the future on the railroads, and which will bring back to the state the transportation and handling and sale within its borders of certain stable products, such as breadstuffs, which by means of differentials among the railroads have been diverted to other ports on the gulf, on the middle Atlantic and on the New England coast. The freight paid on such products, when carried by the canal, will be paid to citizens of our own state; the profit in handling and selling these articles will be paid to the merchants of our two great cities; the low rates which will prevail



upon the canal will regulate the rates on the railroad and will keep the railroad rates at such a low figure that those railroads which have to climb mountains in order to reach the Atlantic will perhaps not seek so large a portion of this particular carrying trade, but will leave the excess which cannot be carried by the canal to be carried by the railroads traversing New York state on a low-grade line.

"It is not alone in the carrying of breadstuffs and other low-grade freight that an adequate waterway, with its cheap transportation, will benefit the state; it will carry lumber from the west to the east; it will carry ores from the eastern part of our own state; to the great steel plant now reaching completion on the edge of your own city, and will in turn carry eastward, at rates with which no route in Pennsylvania can compete, the finished product of these great works; it will carry coal from the east and from the west to the prosperous and constantly growing cities along the interior and bordering upon the canal; and, finally, there is reason to believe that it will carry the lake ores to some point on the Hudson river sufficiently far from the ocean to be safe from attack and provided with a depth of water which the Delaware cannot rival; and at this point will possibly grow up the greatest ship building center of the world.

"The foregoing are through freights and low-grade freights, but with a waterway on which a single vessel propelled by steam can carry 1,000 tons and a united fleet can carry 5,700 tons, which is larger than the average ocean freight steamer, it will be possible to develop a local business in high-grade freights at figures with which the railroads cannot compete, and combined with a certainty in time of delivery equal to that of any freight train.

"Cheap power and cheap transportation are the two prime factors in the cost of manufacture, and, with such advantages as you possess, it requires no prophet to tell that within the next generation here will be a great center of manufactures, possibly, and quite probably, the greatest in the United States. Between these two cities of New York and Buffalo—one with a certain present and the other with an assured future—there is a country of great fertility, possessing at certain points remarkable local advantages for manufactures which, while less important than those at the two ends of the line, are still greater than exist in any other state. The citizens of the state are foolish indeed if they do not reap the full measure of the advantages of the state in which they live and which, by reason of fortunate geographical situation and topographical conformation, are not rivalled by those of any other state. These advantages have brought to our commonwealth its present pre-eminence, but for the last twenty years they have not been fully realized by reason of the neglect of its water transportation line. The enlargement of the canal in the manner now proposed will restore to this transportation line the relative advantage which it formerly possessed.

"In brief, then, the advantages to be obtained from the enlargement of the canal are, first to restore to this state the relative proportions it formerly enjoyed in certain lines of trade and transportation, and, secondly, permanently to fix and build up within the limits of the state manufactures on an unprecedented scale of magnitude.

"The state of New York has been wonderfully endowed by nature; but these endowments will avail nothing if the citizens of the state remain supremely indifferent, believing that everything must come their way. The state has rivals on all sides whose competition must be actively met: On the north Canada, with comparatively insignificant resources, has constructed a waterway far superior to our own and, although handicapped by an icy outlet during so large a portion of the year, it will continue to divert the trade from our borders unless we take steps to prevent it. Far off to the south the gulf ports are being constantly improved and they have a short rail haul from a section of the grain fields; they are striving to divert a portion and an ever-increasing portion of the trade in that direction. Along the coast of the middle states and New England there are other good harbors, on the shores of which the cost of real estate is but a fraction of what it is in New York, and where the railroads are seeking to divert the traffic by the artificial means of differential rates. All of this competition is keen, active and alert, and New York has seen the relative proportion of its trade in certain lines diminished to less than one-third of what it formerly was. In the matter of railroad rates New York has no advantage over other ports, and the same causes which in the past have produced the differentials against New York will operate to produce them in the future. It is only by means of the canal and its enlargement that New York can regain what it has lost, because New York alone can have an adequate waterway across its length from the lakes to the ocean. The mountains and hills forbid this in other states.

"New York is already great and prosperous; but its greatness and prosperity are small in comparison with what is easily within its grasp if it utilizes to the utmost the advantages with which nature has endowed it. To the west, around and beyond the great lakes, are products of agriculture, of animals, of mines and of forests in almost inexhaustible quantities; to the east, beyond the ocean are the teeming millions of Europe; within the state is cheap and practically unlimited power. It only needs cheap transportation to build up within our borders the great highway of trade between the western states and Europe; and

to make this state the most favored spot in all the world for assembling the raw materials and converting them into manufactured products. This cheap transportation can be furnished by the enlargement of the Erie canal."

#### DULUTH MARINE ITEMS—MINING MATTERS.

Duluth, Minn., May 20.—Port Arthur docks showed a busy scene the other day, when more ships were in port than the town had ever seen. In the fleet were the Turret Crown, Ogalbay, Rosemount, Melrose, Quebec, Miles, Venus, Iroquois and Advance, all loading grain from the Canadian Northern and King elevators, and the Manitoba, Empire, Bradshaw and America with freight and passengers. This was at Port Arthur alone, while at Fort William were as many more taking wheat from the Canadian Pacific elevators. From the two towns shipments of wheat for the vessels then in port were about 1,450,000.

The Northern Pacific road is about to begin the very extensive improvements at its Duluth terminals that have been referred to in this correspondence. The docks are all to be filled solid, the 2,200 car yard at Rice's Point is to be trebled in size, a mile and a half of frontage on the west side of the point to be covered by warehouses and docks, and all the space between the city and the Consolidated company's elevators is to be docked for the reception of heavy freight. The cost of the work is estimated at \$1,000,000 and this is in addition to the \$500,000 spent last year for the same purpose. It is believed that when this work is done the road will have at Duluth the largest and best-arranged terminal system, land and water, to be found in a single group in the United States.

It is not expected that any large tonnage of either wheat or flax will be shipped from the head of the lakes for some time. The recent sharp drop in freights caused by line boats that were not getting enough flour and wanted wheat to fill out with.

Capt. C. L. Potter, United States engineer, who is to have charge of this district, is expected here June 1. Major Beach, who has been here temporarily since Capt. Gaillard's departure for Washington, has returned to his home. Capt. Potter's chief work for the immediate future will be the construction of the concrete piers for the south harbor entrance, all preliminary work and plans for which have been carefully carried out, with practically all contracts let and operations already begun.

The Minnesota Iron Co. (a part of the United States Steel Corporation) has begun drilling on the famous section 30, Vermillion range, and is to put on several drills, it is claimed. The company has a lease of all the interests in what is known as the "Warren 80," aside from the interests it holds in fee. Originally, after the close of years of litigation, it was found to be in possession of the fee to thirteen-twenty-fifths, and it then secured leases from the owners of the balance of the property. Most of these owners have since sold to it, so that it now controls in fee nearly the whole tract. This land lies cornering on a part of the tract familiarly known as the section 30 land, and now under lease to the Section 30 Co. The Warren 80 is practically the north half of the southwest quarter, and all the work of the Section 30 Co. is directly north of it. The Section 30 Co. is drilling all its holes with a southerly inclination and the Minnesota company is beginning its drilling at a northerly angle. The dip is generally supposed to be to the north at that place.

Within a space of about a mile the Oliver Iron Co. (also United States Steel) is sinking the four biggest shafts, all things considered, that it has anywhere in the Lake Superior region. The most westerly of these is the deep incline shaft of the Pioneer, which is three-compartment and is steel lined throughout. Next to it is a vertical shaft for the Zenith, which is going down rapidly and is expected to develop a very large ore body. Next east of it is the enormous steel shaft house of the Sibley mine, surmounting a very deep shaft. Still further east is another steel head frame surmounting the great shaft of the Savoy. These two shaft houses are about 160 ft. high, all of steel, and are the best in the world. It is proposed to erect somewhat similar shaft houses at the Pioneer and Zenith shafts. Each of them is to be equipped to hoist 500,000 tons a year, each is in rock and each is most substantially built, and all to be equipped correspondingly. The Sibley and Savoy are now equipped with hoisting machinery and the Savoy shaft is in commission. The Pioneer shaft is resting on bottom and a drift is being run to connect it with the workings.

The Cook County Mining & Land Co. has filed articles of incorporation. It is said to have the ownership of 1,600 acres of land, claimed to be mineral bearing, in Cook county, and some stock is being sold here at the rate of 15 per cent. of par. There is some casual exploration for ore in this county, but nothing of consequence is being found as yet, so far as can be learned.

Commonwealth, to date the largest battleship afloat, was launched at Govan last week. She is the first vessel of the British navy to have her ten 6-in. guns protected by an extended barquette, instead of by casements. Her other armament consist of four 12-in. guns, four 9.2-in. guns and twenty-four small guns. The new battleship speed is to be 18.5 knots per hour and she will carry a crew of 755 men. Her engines are to develop 18,000 H. P.

Mr. Franklin D. Mooney has been appointed general manager of the New York & Porto Rico Steamship Co. in place of Mr. Henry T. Knowlton who died recently.



## AROUND THE GREAT LAKES.

Capt. W. L. George, an old-time lake navigator, died at his home in Benton Harbor Monday.

A cable connecting South Manitou island with the mainland at Grand Haven has been completed by the general government and will be of great benefit in case of wrecks in the region.

H. H. Hinton of Sunderland, England, and W. Laing of London, who are interested in ship building in England, are making a tour of inspection of the various ship yards around the great lakes.

A harbor of refuge at Portage lake, 10 miles north of Manistee on Lake Michigan, is to be made available for vessels of deep draught. The work contemplated includes the dredging of a deep entrance to the harbor. The Fitzsimons & Connell Co. has the contract.

About June 1 the Buffalo Dredging Co. will begin work on a rock-cut channel leading to the Reading coal trestle and then on to Black Rock harbor that will involve an expenditure of about \$800,000. The job involves the removal of a bed of rock 2,000 ft. long, 500 ft. wide and 9 ft. thick. The contractors are given until December, 1906, to complete the work.

H. A. Hall of Rondeau, Ont., has been in Cleveland for several days past trying to make arrangements for a passenger service across Lake Erie to Rondeau during the present season. The small steamer *Urania*, which was on this route last season, has been taken off and is for sale. Mr. Hall is anxious to communicate with anyone who has a vessel suited to the service.

The United States government has bought the tug *Circle*, formerly the *Ada Barrett*, and will use her in connection with dredging and other work in the harbor of Duluth. The tug was bought from Leroy Brook of Wyoming, O.; J. G. Mitchell, executor of the late Jethro Mitchell of Toledo, and W. C. McClure of Saginaw. The price was \$2,500.

Four Hulett clamshell unloading machines working at Conneaut Tuesday on the steamer *James H. Hoyt*, which is especially suited to the operation of these machines, removed 5,217 gross tons of iron ore in 3 hours, 56 minutes. This is at the rate of 1,326 gross tons an hour. The steamer's entire cargo was unloaded automatically. When she left the clamshells she departed up the lakes.

The Chicago & Great Lakes Dredge & Dock Co., the Duluth Dredge & Dock Co., the Lake Superior Contracting Co. of West Superior and the Starke Dredge & Dock Co. of Milwaukee are all to be engaged this year on the work of widening and deepening the Sturgeon Bay ship canal connecting Lake Michigan and Green bay. The purpose is to widen it from 100 to 150 ft. and to deepen it from 17 to 21 ft. Nearly 2,000,000 cu. yds. will have to be dredged away. The government appropriation for the work is \$175,000.

Mr. Luther B. Dow of 974 Madison street, Brooklyn, N. Y., grand counsel of the American Association of Masters and Pilots of Steam Vessels, writes the Review as follows: "Capt. Frank N. Russel, a member in good standing in United Harbor No. 1 of our association, was found dead at Coney island May 13. I made proper arrangements for his funeral. I understand that he has an uncle who owns towboats on Lake Michigan and that he worked for his uncle a few years ago. If you can by any means find the uncle of Frank N. Russel please ask him to communicate with me."

The Anchor Line at any rate is a corporation which is not soulless. For nearly fifty years Mr. D. M. Brigham has been identified with the Anchor Line. He entered its employ in 1854 and has remained with the line in various positions ever since. A great part of his service has been at Milwaukee. Last season he resigned voluntarily and was given a pension. With the opening of the present season Mr. Brigham was notified of his appointment as special agent with headquarters at Cleveland. "His duties will be just what he cares to make them and his time will be practically his own," said Mr. J. C. Evans, the western manager. "The Anchor Line appreciates good, faithful service in its employes and Mr. Brigham has rendered them. His wife and daughter desire to live in Cleveland and he has been given an assignment there. His position is special agent for life."

## OBITUARY.

Death has taken away Mr. Benjamin F. Jones, Sr., of Pittsburgh, member of the advisory board of the Jones & Laughlin's Steel Co. The end was entirely unexpected, as up to a few days ago Mr. Jones was in rugged health. He was seventy-nine years old. Mr. Jones was one of the foremost iron makers of the country, engaging in the manufacture of pig iron in Pittsburgh in 1851. He had since early manhood known nothing but the severest responsibilities and the cast of his mind had grown habitually serious. He was not classed among the writers of the day and yet an essay on the subject of protection, written by him, is regarded as a classic. Nor was he considered an orator, yet his speech in calling the Republican national committee together in 1884 is memorable still. He was a conspicuous figure in the nation's life.

Louis Bleyer, a veteran marine reporter, who was widely known along the great lakes, died at St. Mary's hospital, Milwaukee, last week. He was born in Milwaukee on Christmas day, 1837, and is said to have been the first child of German parentage born in that city. He became a printer at an early age and had

charge of the mechanical department of the Milwaukee Sentinel for a number of years. Later he started a marine column in the paper. It was through his exhaustive reports of the loss of life and property on the lakes that Prof. I. A. Lapham took up the movement to establish a weather signal bureau and successfully carried the matter through congress. He was at one time offered the superintendency of the life-saving service on Lake Michigan but declined. After leaving the Sentinel Mr. Bleyer became Milwaukee correspondent of the Chicago Times and his gossip letters to that paper will be remembered by many. He subsequently worked on the Chicago Times and Tribune, but of late years had conducted the marine department of the Evening Wisconsin. Mr. Bleyer became interested in vessel property in the sixties when he built the schooner *Typo*. He was unmarried.

## SAFETY ON THE SEA.

(Wentworth Packard in the Boston Evening Transcript.)

The feeling uppermost in the minds of our unhappy fellow-citizens who were wrecked on the Bermudan coral reef was doubtless one of dumfounded surprise. For the ocean passenger thinks little of danger nowadays; he has paid his passage money and that settles the whole matter. The ship will bear him in safety and comfort and he has the utmost confidence in the ability and prudence of the captain who will bring him to his desired haven unharmed and on time. When anything does go wrong with ship or passengers it is the unexpected that has happened and the news flashes consternation and surprise over the civilized world. Accident, even delay, is noteworthy because it is rare. Yet the North Atlantic between New York and Europe is the stormiest ocean of the world, the dreaded "western ocean" of the sailor men of the last generation. In winter time it is the scene of a constant succession of westerly gales. The wind may shift from southwest to northwest, but still it blows a gale, and the change, if change there be, is apt to be from an ordinary gale to a hurricane. But with the thousand passings and repassings of the great liners and the smaller fry over the great ocean lanes the times when they have met and gone down to death do not number once in a decade. The west wind and the fogs are perfectly capable of it but the watchful care and ingenuity of man triumph over this as they do many another danger of the sea and one's life insurance rate is just as low on the liner as it is in the sanctity of his own fireside.

It is the government which has done this thing. From the time the plans of an ocean-going vessel are begun until that vessel has made her last port, sent her last passenger over the side and drawn her fires for the last time, its wise and providential provision has never left the vessel. Thus and so, it says, shall you build your passenger boats, thus and so shall you man them, so many passengers shall you carry in such a way, and in this wise shall you sail. The system has been a growth, carefully and wisely fostered and attentive to every minute detail, until today every point would seem to be carefully covered. The hull, says the government or the representatives of insurance companies, shall not be made of certain kinds of steel, they are not the strongest; it shall be built only of another kind which is the best. Every plate must be tested by an expert and shown to be fully up to the required standard. So many rivets shall be put in each plate and in such a way, and the hull when finished shall be of a certain fixed stability and strength. As you go on into the hull of the vessel and note the machinery and boilers the regulations thicken till they sit upon each minute piece. The rules of the steamboat inspector cover and include vast arrays of tables of figures which apply to the boilers alone, dealing in every possible way with their efficiency and making, so far as human foresight may, everything about them absolutely safe and durable. Boilers used in a single vessel have grown in number since the old days of steamboating and in size, and the pressure upon them has multiplied by twenty but they cannot grow fast enough to get away from the regulations. Every plate must be tested before it is put in, every valve and connection has its rule that must be lived up to.

In equipments of hull and machinery, however, the steamboat companies go ahead of the inspectors and add factors of safety and speed which are not required except for the reputation and commercial advantage of the company. One of the greatest of these later appliances for the safety of passengers and ship is the matter of transverse bulkheads. The government has required three or more of these since 1871 on all passenger boats. In the old days a hole in the ship was a hole in the whole ship and unless it could be plugged the ship went to the bottom. Nowadays the ocean-going steamship is divided into a dozen watertight compartments. If the vessel strikes a rock or a derelict and staves a hole in one compartment, the ship is still safe. The bulkhead doors are promptly closed, the compartment may fill with water if it must, and still the buoyancy of the vessel is preserved by the other compartments and she proceeds to port above water and with all hands safe.

The modern ocean-going vessel is now built with a double bottom, the inner one a couple of feet from the outer, and built just as tight and staunch. Here is an added factor of safety in the hull, for sometimes a ship in approaching the coast will touch a sunken reef and pierce the rather easily ripped steel of her bottom. In such a case it takes a far heavier and deeper blow to reach and penetrate the inner lining. A noteworthy in-



stance of the value of this double bottom was the case of the steamer *Pilgrim* of the Fall River Line some years ago. The vessel was then quite new, the pride of the line, and was fitted with all then known appliances for safety, including the double bottom. One morning when heavily loaded with passengers and soon to make her dock in New York she slid over some unexpected obstruction on the bottom, perhaps one of the numerous sunken ledges in that vicinity. A point of this obstruction slit a tapering hole in the outer bottom a hundred feet long and varying from a knife edge to four inches wide. The inner bottom was not penetrated, however, and though the great steamer settled a little she steamed up to her dock and discharged her passengers as usual. What would have been the disastrous result had she been built with the old-style single bottom may be easily seen, for the slit was such that though she was built with compartments, the opening was long enough to have filled them all. The double bottom is now in extensive, indeed almost universal, use on the later models and is used as a ballast tank, as well as an appliance for safety, water being let in to increase the stability of the ship when without cargo.

In the old days a steamboat captain was simply a person hired by the company to take charge of its boat. Now he is practically a government official, and he and his officers have to pass the carefully devised regulations of the government, which are intended to prove that he is a man of ripe experience and fully competent. In transatlantic vessels, service for several years in subordinate positions must be proven and besides a written examination passed in all matters pertaining to seamanship and navigation. A similar rule is applied to coast-wise steamers, and, when it first became a law years ago, caused much consternation among some of the old sea dogs. They were capable of navigating successfully their vessels to and from the accustomed ports, but the passing of these written examinations was a terror which no storm had ever equalled. It is related that one of the old-time successful captains of the Bangor Line, who could not tell how to take a sight or a lunar observation or handle the sextant and quadrant, replied, in answer to the question: "What is a day's work?" meaning the distance the vessel should log in a day, "Get in all the freight you can and leave for Bangor at 5 o'clock."

As to the life saving appliances required aboard an ocean steamship, their number, variety and the details fixed in regard to them are simply astonishing. A vessel of 10,000 tons must have about 8,000 cu. ft. of boats. Having those she may carry her full capacity of passengers. That is what the inspectors call "boating her up to her tonnage." But if for any reason she carries only part of her capacity of passengers she must have boats enough to supply these passengers (and crew) and need carry no more. One-third of this boat's capacity may be supplied in life rafts if the company prefer but in all cases the specifications are carefully worked out in the minutest detail and make a "code as long as the moral law." But this is only the beginning in the way of life-saving apparatus. To enumerate the life preservers, buoys, lines to shoot ashore and guns for shooting them, floats, rubber, canvas, cork and wood, and all the details in regard to them, with rockets, signals and everything else, would require the writing of a book.

#### STRANGE LEGEND OF THE NORTH ATLANTIC.

These safeguards constitute a necessary equipment, for, after all, there is always the chance of wreck, by sea or shore; the most careful of navigators will sometimes err, and there are dangers which come not within the ken of human foresight. Note the strange fate of the *Huronian* of the Allan Line. She was a cargo boat built for crossing the Atlantic, a modern steamship of good size and fitted with watertight bulkheads, double bottom, splendid engines and all the latest equipments. She had a careful captain and a good crew. About a year ago she sailed westward on her maiden voyage, passed the headlands and disappeared in the mysterious mists of the North Atlantic never to be seen or heard from again, like many another.

And that brings us to a strange legend of the North Atlantic, often repeated but never yet quite verified. Somewhere in mid-ocean, due north of the Azores and not far from the lines of travel, a single bare pinnacle of rock has been repeatedly sighted by passing vessels. No searching vessel sent out has ever seen it, no vessel has stopped to examine it, yet the position given for it is about the same each time. It may not be there. Experienced navigators who have never seen it smile and say it was a basking whale or a derelict or a figment of the imagination, yet more than one vessel's log notes it and it is charted in the minds of careful mariners with a question mark as a doubtful point, one to be avoided on principle if nothing more. The trend of soundings north of the Azores confirms its possibilities. There is a broad ridge of shallow water that extends far north of these islands and nearer the islands are scattered bits of rock that approach the surface. Why might not this be the last pinnacle on the tip of the plateau? If it is really there, and it is yet to be proven that it is not, one may well question if it is not the port made by more than one missing ship that like the *Huronian* has left behind her nothing but mystery.

Within the year a fishing schooner lay on the banks far east of Sable island and sent out her dories. A fisherman in one of

these boats looked over the side and saw beneath him a spot that looked like a compact school of squid. He put a line over and found to his astonishment that it was bottom instead, a little peak of rock that stuck up from unknown depth to within 2 or 3 fathoms of the surface. No such reef is charted, but it was there, right in the path of ocean liners. The fishing schooner brought back the story and the hydrographic office sent a survey vessel up to the spot, as near as could be found, sounded all about and got 70 fathoms of water. That was to be expected. So little a spot is like a needle in the haystack of the vast sea. The water was 70 fathoms deep yet the fisherman declares that a rock was there and there is no reason to doubt his word. The office has marked it on its latest charts with a question mark. It seems in a way to make more plausible the story of the pinnacle in mid-ocean.

The hydrographic office takes cognizance of all these stray stories and seeks them out for the benefit of mariners, and that is only a small part of the work it is continually doing for the making of safety at sea. Incoming captains at fifteen United States ports report to this office and get information in return. All evidence is received and sifted, reported at Washington, and weekly bulletins and charts sent out for the use of mariners. All over the world the United States hydrographic office is known to mariners as the best in existence. Mariners of other countries ask in their home ports for the reports of our office in preference to the reports of their own government, as later and more surely reliable. The office keeps track of the weather at sea, the path of storms, the position of derelicts, and charts them all monthly. It collates and sifts a vast fund of information to mariners, issues a weekly bulletin and does much more for their safety and comfort.

#### SPECIAL MEETING OF SUPERVISING INSPECTORS.

A special meeting of the board of supervising inspectors of steam vessels has been called to meet in Washington on June 3. It is the purpose to discuss at the meeting certain changes in the administration of the service and new plans with reference to inspection will also be considered. The rules and regulations governing the inspection of vessels will be changed in important particulars. One of the most important subjects to be discussed is that relating to the construction of marine boilers. The rules will be revised with reference to the thickness of shell, spacing of braces, riveting and all the other requirements entering into the construction of marine boilers. The purpose of George Uhler, the new head of the steamboat inspection service, is to have marine boilers and all equipment of steam vessels over which the government has jurisdiction conform to modern practice. The administration of this service has been so lax during the past few years that little attention has been paid to the question as to whether owners of vessels have been prompt in securing modern apparatus and appliances. It will be impossible for Mr. Uhler to put into effect all the reforms in contemplation by means of rules and regulations. New law on the subject will be necessary and at the meeting of the board of supervisors it is expected that information will be obtained which will materially aid the department in making recommendations with reference to amendments to the law relating to steamboat inspection. The board will also consider at the coming meeting any protests that may be received relating to the building and operation of steam vessels.

#### DOCKING WARSHIPS AT NEWPORT NEWS.

Newport News, Va., May 20.—The battleship *Texas* will be docked at the shipyard this week for repairs, after which she will join what will be known as the North Atlantic coast protection squadron as flagship. This squadron will do duty while the battleship squadron under Rear Admiral Barker is away on its cruise to the Azores. Rear Admiral Sands raised his flag over the *Texas* Monday and will command the coast squadron. The battleship *Illinois* will follow the *Texas* in dry dock in the next week or two. The *Illinois* will be the fourth warship docked at the Newport News ship yard in the past three months. First the *Maine* was floated in the big dock, to be followed by the German cruiser *Gazelle*. The *Texas* goes in this week. The battleship *Missouri* has also been in dry dock in that period, but she is not in commission yet.

The old training ship *Alliance* arrived in Hampton Roads Saturday with 300 landsmen aboard, just seventeen days overdue from Kingston, Jamaica, a distance of only 1,200 miles. The *Alliance* left Kingston April 17 and the navy department allowed twelve days for the cruise up the coast. Contrary winds held the ship at sea until Friday night last. The department was preparing to send half a dozen ships out to search for the trainer.

The Old Dominion liner *Monroe*, new vessel, is still at the shipyard undergoing alterations, but it is expected that she will get away by June 1. After making about six trips between here and New York it was found that the hatches and other parts of the vessel were heavier than necessary and changes are now being made.

Rear Admiral Wise will on June 1 take command of the United States training ship fleet on the Atlantic coast and it is probable that he will raise his flag over the *Prairie* in Hampton Roads.



## EFFECT OF MODERN ACCESSORIES ON SIZE AND COST OF SHIPS.\*

By W. H. WHITING, Assistant Director of Naval Construction, British Navy.

In limiting the title of this paper to warships, I do not wish to suggest that the influence of these matters on the size and cost of merchant ships is negligible, but only that in most cases it is relatively less, so that a discussion of its nature and extent would be for this reason, as well as for others to be set forth later, of far smaller importance. By modern accessories I mean those features which have been introduced into warships, especially during the last twenty years, at such a rapid rate, but which are not specifically designed for and necessary to the main object of the vessel's existence—the overpowering and destruction of the enemy in the day of battle. For this end seaworthiness, structural strength, habitability, speed, coal supply, gun power and protection are essential; they are, at least, features of primary importance. They will be regarded as generally indispensable for battles on the high seas such as have decided the fate of nations. But there are, in every large warship, hundreds of features which are not, like these, of primary importance. They add to the appearance, or convenience, or even to the efficiency of parts of the ship, but they can hardly be said to be indispensable. They affect, perhaps, the facilities for navigation or other wants of ordinary peace work. Sometimes they increase the efficiency of the primary features named above, though they are not absolutely necessary to their existence. They often provide against risks, more or less remote, of accident or breakdown in peace or war. Many are due to the general rise in the standard of comfort in life ashore, and to the many modern inventions which have made this comfort possible. But, whether taken singly or all together, it cannot be said that they are essential to the supreme end for which the navy is maintained.

There is, as one might expect, great difference of opinion as to the importance or the necessity of these matters. As regards many of them, there would be found on detailed inquiry a general opinion that they ought to be retained. As regards many others, various conclusions would be arrived at, according to the experience, or the calling, or the temperament of the individual; and according to his appreciation of the convenience afforded or the risk avoided by each item. In some cases a landsman might reasonably form a judgment about them; in many others only a naval officer could well do so. I shall offer no opinion about any of them. I desire only to show that they exist, to try to classify them, to name some of the principal causes which originate and maintain them, and to point out and emphasize the consideration which is common to them all—that they have to be paid for. The payment may be mainly in cost, or it may be—it generally is—in increased size of ship as well, and in decrease of speed or offensive power or protection. It may be in ways less evident, though not less certain or exacting. In whatever form it be, the payment has to be made, and the price, I fear, is not generally known. It is more easy to understand how the influence of a number of subordinate items escapes adequate notice when we recall the discussions in the early years of this institution respecting fighting ships. It was not unusual in those days to hear demands for an ideal vessel—heavily armed, thickly armored, with high speed and a big coal supply, but of small dimensions. Many years passed before that mythical vessel disappeared. There are still to be met with lingering traces of a belief in her. But the impossibility of securing all these qualities in one small ship is now realized. It is seldom contested that if you take a given design, or ship, and put, say, more guns into her, you must accept less coal, or armor, or speed. The proposition that a ship is a compromise in regard to these important features is well established. Unfortunately it is not equally well understood that the matters of which I speak have a cumulative effect on the ship equal to a large variation in one of her principal features. And even where there is an acceptance of this general statement in the abstract, there may be no small difficulty in securing its application to the particular case in hand.

The effect on the whole design of a substantial variation in one of the principal qualities of a ship has often been investigated. It is well known that if you add to the weight of the armor, or coal, or guns by a certain definite amount, and if every other quality of the ship, save this one, has to be maintained unimpaired, the result will be a total increase of weight, size, and cost which far exceeds the original increment. If, for instance, in order to increase the speed, you add 100 tons to the weight of the machinery, there will follow in general such increased weights of hull, equipment, coal and armor as will add perhaps 300 tons or more to the displacement. It is, of course, equally certain that a number of lesser items, whose weight amounts in all to 100 tons, will likewise involve an increased displacement of much more than 100 tons. It would be travelling outside of the proper scope of this paper to show in detail how variations of equal amount in the weights of primary features of a design have, in the above conditions, such different effects on the design; or how variations of a constant percentage in the same primary features may produce, in designs not of the same type, widely different results. It may be mentioned, however, that the chief factor in determining the effect of such a variation

is the space it demands considered in reference to the demands on space in the existing ship. Thus, an increase in thickness of armor in a battleship, and an increase in speed in a small cruiser—keeping all other qualities constant in each case—represent, perhaps, opposite extremes in regard to the relative change produced in the design. Considerations of the same character govern the effect on a design the matters of which this paper treats.

I do not propose to examine a number of specific instances of the influence of such features in existing classes of ships. There are obvious objections to such a course. But while it is hardly practicable to prove in detail how important these seemingly unimportant items are, I will mention two examples which will illustrate the general proposition. The first is that of the steamboats carried by a warship, or, more strictly speaking, the weight of the largest steamboat. Until twenty years ago, the weight of the largest steamboat carried by most vessels was about 9 tons. This boat—a 37-ft. steam pinnace—could be hoisted at davits by hand, and the only fittings required were the davits themselves and their usual accompaniments, the boat's falls, and perhaps crutches. But the size of steamboats has been increased until most of our large battleships and cruisers carry two 56-ft. steam pinnaces, each weighing 18 tons. Following the introduction of these boats, we have had one, and generally two, masts of great strength, with corresponding shrouds, and a 60-ft. derrick with massive head and heel castings, 6½-in. steel wire purchases and topping lifts, 25-in. blocks, eyeplates at mast head and on deck tested to 60, 70, and even 90 tons each, two steam boat hoists with beds, casings, steam pipes, etc., skid beams and boats' crutches for stowing the boats in-board, hull structure for supporting the masts, stores necessary for the maintenance of these fittings, and, lastly, alternative gear for hoisting the boats by hand. In this case the replacement of two 9-ton boats by two 18-ton boats means an addition, not of 18 tons, but of at least 70 tons to the weight carried. To carry this load without loss of speed or other qualities an addition to the displacement considerably exceeding 70 tons will be necessary. I express no opinion as to the need for these boats. They are far superior to the older boats in speed and seaworthiness, though these indeed served for many years in the same harbors. They have, too, increased fighting powers as boats. But I class them as minor matters, because it is not generally supposed that they and their accompaniments will have much influence on a fleet action of today, except as debris. They offer an excellent example of the numerous additions which follow a single change.

A corresponding result may be brought about in another way. Instead of increasing the magnitude of some particular item, you may develop it with the object of increasing its efficiency or of lessening the chance of a breakdown. An example of the great weight involved in such an elaboration of a set of fittings for a single purpose is afforded by the anchor and cable gear in a ship. In many merchant steamers we find what may be taken as the minimum provision which is compatible with safe navigation. These vessels carry stockless anchors which require no special stowage. Their cables come in through open hawse pipes to a windlass, and pass straight into the lockers immediately below. They ride by the windlass. No other fittings are supplied, except, perhaps, bow stoppers at the upper end of the hawse pipes. If we compare these rudimentary fittings with what is found in most existing battleships and cruisers, the difference is very striking. The hawse pipes have hinged flaps on the outside, and hawse plugs and hinged flaps as well at the inner ends. Each of these three sets of gear is adapted for fitting over the cables, and the outer flaps are closed by special screws working through the body of the hawse pipes. The anchors have hitherto been stocked, and this has necessitated beds with numerous appliances for securing and letting go. There are massive catheads, which are hinged to turn down for action, and need special appliances to get them up again. Immediately abaft the hawse pipes come the bow stoppers, and next to them a manger board with further fittings for excluding water. Along the deck there are several stopper bolts with cable stoppers, some of which are nearly equal to the strength of the cable. Then there are large riding bitts as well. Following these three or four sets of gear for holding the cable, there are the cableholders proper above the deck, and the compressors below, each capable of serving the same purpose. The cableholders for the two bower cables are arranged for hauling with one cable and veering with the other, or vice versa, or for hauling or veering both cables simultaneously. One cableholder is arranged to work the sheet cable as well. Then, as a stand-by, the middle line capstan, which works the cat chain or wire, is also fitted to bring in either of the bower anchors or the sheet. Immediately under the upper deck are the heavy lever compressors, with purchases, eyeplates, and cleats for working them. To provide for the cable running out either round the windlass or round the bitts, these compressors are made of spectacle form, so as to act equally well in either direction. The capstan can be worked by hand as well as by steam, and gearing is provided to work the windlasses also in this manner. Besides all these fittings there are numerous special appliances. To enable

\*Read at the spring meeting, Institution of Naval Architects, London.



the ship to ride conveniently with two anchors down she has heavy mooring swivels, which necessitate the hawse pipes being big enough to take three parts of the cable side by side. The chain lockers are usually two or three decks down, and the heavy deck pipes have watertight covers and bucklers for fitting over the cable if in place. The capstans have watertight glands on each deck. The large rollers round capstans are bushed. The catheads have locking gear, besides the tackles fitted for holding them in position. And many other fittings add to the provision which is made for every emergency or risk.

I say again, I offer no opinion as to the usefulness of each and all of these fittings. My point is that most of it is not of primary importance in the sense in which these words are defined above, and that for a ship of given dimensions the fitting of this elaborate apparatus (which indeed goes beyond my description) must necessarily exclude many tons of armor, armament, or machinery, or in the alternative must involve several times as great an addition to the total displacement. It will not be supposed, of course, that I am naming cases which have been in any way overlooked. It is well known that stockless anchors are being fitted in most of the cruisers and battleships now building. The question of steamboats is also one to which it is not necessary to call attention. I have intentionally chosen two cases which, though found in most ships afloat, do not exist as here described in the latest navy practice. These are two somewhat striking instances of the magnitude which such fittings may attain. There are scores, perhaps hundreds, of similar though less conspicuous cases to be found in most ships of war. We find in one set of instances that, starting from what is demanded by the bare necessity of the case, we have added largely to the weight and cost to secure additional efficiency or convenience. In the second set we have added weights to provide against secondary or even more remote risks. The first group includes the lengthening of funnels; the raising of machinery cowls and ventilators with their elaborate gear; the provision of stowage for every article in the ship—often of duplicate stowage; the special contrivances for watertightness in weather work and in electrical fittings; and the great elaboration of drainage. The second includes such instances as the various kinds of apparatus for working the cables, the provision for steering from different places by various means, the use of automatic valves, and of special pumping, flooding and ventilating appliances.

If one were to attempt to lay a complete list before you it might perhaps be thought that some of the items are so small that a reduction in their weight is hardly worth making. One often hears it said: "What will you save—not a hundredweight?" Or it may be that even a smaller figure is named. But it is obvious that a small percentage on a large number of items may give quite an appreciable result; and very often the percentage is a large one, though the absolute weight concerned is but little. Further, each saving has to be multiplied by two or three to get its gross effect on the ship. And lastly, the real question is: "What can be added by such savings to the armament, or to some other primary feature of the ship?" Take for example a 9,000-ton cruiser, whose hull weighs, let us say, 3,500 tons, her machinery 1,600 tons, and her armament 700 tons. Now, supposing even that on the greater part of her hull structure proper and of her machinery no great saving is possible, yet if we can save 5 per cent. on 2,000 tons we have 100 tons, and this is 14 per cent. on the armament weights. It may be a very fair subject for inquiry whether the additional 5 per cent. of hull and machinery weights will be worth as much as the 14 per cent. of armament when the vessel goes into action. And if you go round a ship and carefully examine the weights in detail, there are a very large number on which you can conceivably save 5 per cent. There are fewer than one might at first suppose which are not capable of an economy of 5 per cent. Sometimes, of course, you can reduce the weight of fittings by more careful design alone. It needs to be made clear, however, that you cannot always do so. Such savings can only be got in many cases by sacrificing something which admittedly adds to efficiency in a minor sense. This is inevitable. You cannot get something for nothing, or, if you do, it is not worth having. Yet it is not always understood that economy in these matters often means giving up something that you want and not merely something that you do not want. It is hardly to be supposed that there will be found in a modern vessel many things that are absolutely useless. The main question in any given design is whether there have been selected and combined the most advantageous qualities which can be got on a given displacement and for a given price at that moment. If we have it, it is a successful design. If we have materially sacrificed qualities which will certainly be needed at the beginning of an action to provide for risks which may occur at its close, or for other remote contingencies, then the presumption is that there is a more satisfactory design possible. It is often the case that those who appreciate the advantages of the little efficiencies in detail, nevertheless fail to recognize why the completed vessel compares unfavorably as to her fighting qualities with a ship from which such fittings have been more rigorously excluded.

Many causes have worked together to affect a modern warship in this way; many are still in operation; and I wish to devote my remaining time to a brief summary of those which can well be brought before this institution.

(1) The natural tendency in any large organization is to retain things which have come to be of less use than formerly, or even of no use. From this tendency navies are not exempt, and we find fittings and stores retained which might possibly be

omitted with advantage. The strong feeling in favor of the retention of sails long after these had ceased to be of use, and had even become a danger, is an illustration of this tendency.

(2) The rapid development of mechanical improvements of every kind leads to the introduction of labor-saving appliances in warships and merchant ships alike. But, whereas these are accompanied by great reductions in the crews of merchant ships, it is necessary to keep big crews in warships for fighting purposes, and thus we get on the one hand steam pumps to save daily manual pumping of fresh water or of the bilges, and on the other hand special fittings for exercising purposes.

(3) The higher standard of life ashore and afloat adds rapidly to the weights of warships. The provision for food, cooking, bathroom and sanitary fittings, ventilation and artificial light has greatly increased in the last twenty years and is still increasing. A large proportion of the complement needs superior accommodation, corresponding with their higher training. The weights of tiling and of piping for hot and cold water are vastly greater than those that served for many ships which are still in commission.

(4) The steam or electric motors used for the purposes of the last two paragraphs involve a heavy coal bill, so that to give a ship a specified steaming capacity it is necessary to add a much larger percentage of coal than formerly. This load has to be carried at the given speed.

(5) The distrust (or rather the partial trust) of new appliances adds largely to weight and cost. Candles or lamps give place to electric light, but the fear of losing the light involves the carrying of two systems instead of one. So it has been with sail and steam power, steam and hand steering, hydraulic gun gear and hand gear. And as it is but rarely that the new appliance has an advantage in every conceivable circumstance over the old there is a great tendency to carry both. In almost every case such duplication involves some new chance of a breakdown; and this serious consideration applies also to the two following paragraphs. New risks, thus introduced, have brought about many accidents in recent years.

(6) A natural desire to provide for every risk leads to great increase in detail. Thus, many vessels used to have five different methods of operating the steering gear. The anchor and cable gear, the ventilation, drainage, and pumping arrangements had and still have great elaboration. It is, of course, very difficult to so accurately appraise a particular risk as to say that it is not worth providing against. It is still less possible to provide for it without making the ship as a whole suffer to a certain definite extent.

(7) A closely allied tendency is that which leads to the duplication of fittings. Thus there are two steering engines, or two leads of shafting to operate the steam steering engine; the dynamos are designed so that one may always be under repair or idle; and each of the hydraulic pumping engines is equal to the whole demands of the armament. Here, too, the cause of the demand for the increased weight is the difficulty of saying exactly what risk should be accepted. The logical course would be to make provision proportional to the magnitude of the risk multiplied by its probability. It is possible that in some cases an approximate valuation might be obtained by careful study, and I would like to suggest that no small service might be rendered to the navy by an examination of this question.

(8) A great source of increased weight is the additions called for by comfort and convenience, rather than by direct necessity. Thus bigger steamboats, better artificial lighting, double or rain awnings, side screens, wind-shoots, ice machines, etc., though each of undoubted utility, and though reaching in no way beyond the standard of comfort in passenger steamers, do, nevertheless, impose a considerable load, direct and indirect on a warship.

(9) The desire, and perhaps the necessity, for smartness adds largely to weight. First and foremost in this connection comes paint. One who has not the records before him may well be incredulous at the enormous weight of paint worked into a ship. The most serious feature is that the process never ceases, and the greater the pride in the ship the greater the tendency to sink her with white lead. I have been told of a case in which there was removed, from the inner surface of a portion of the crew space of a destroyer, paint of a weight of over 2 lbs. per square foot. This is, no doubt, exceptional, but I doubt whether all officers realize how, by a rigid economy in paint, they may not inappreciably benefit their ship. A curious development of this wish for smartness is the desire for screw gear on board ship. Not merely in rigging, but in many fittings, such as awnings, ridge-ropes, guard chains and ropes, and in the securing of all kinds of gear, lashings have given place to screws and slips, which not only add directly to the weight, but impose greater strains on the fittings. The screws mean bigger awning, stanchions, and so on.

(10) Auxiliary machinery tends to be continually increased in power by the competition of fleet life. Weighing anchor, laying out anchors, and other operations carried out in concert lead to the working of gear for all it is worth, and to demands for more power, although the direct use in war may not be great.

(11) Any doubt as to tactics, whether of defence or offence, must inevitably add to weight. Thus the torpedo net defence, now rarely carried by fast cruisers, formed a big load in earlier vessels. Similarly, questions as to the positions of search lights, the use of fighting tops and of submarine mines have had the like tendency. There is a larger sense in which this consid-



eration affects ships. If it could be exactly and permanently determined in what way a fleet should be used, great economies in design would no doubt be possible. It might conceivably lead to greater specialization, so that a squadron, not necessarily homogeneous as to offence or defence, should become the unit of design. The extended use of auxiliaries might tend to ease many difficulties in the design of a single fighting ship.

(12) The greater demand for perfection in fittings has led to increased weight in recent years. This applies particularly to such matters as watertightness in skylights, ports, casings, and electrical fittings. No one who compares the fittings of two ships whose age differs by ten years or more can fail to see the additional weight of fittings due to this cause.

(13) A desire not to press machinery severely imposes a great load on a ship compared with another in which such pressing is admissible. If this consideration extend not merely to the boilers but to the many pieces of auxiliary machinery throughout the ship, the effect is very appreciable.

(14) Daily life in a ship tends to call attention far more to what is felt to be lacking than to what is redundant, and hence in a ship, as in a house, there is a constant tendency to add new fittings at a higher rate than to dispense with others.

(15) Desire for great durability may unduly increase the first cost and size of a ship. It is possible that it may pay better to accept frequent repairs than to add to scantlings and weight.

(16) The general tendency to raise important parts of the vessels in relation to the water-line makes it even more difficult to secure adequate stability, and this involves increased dimensions. Economies tend to be made in the lower parts of the ship. Additions are more often high up.

(17) Every accident to a ship leads to demands for mechanical provision in all other ships to meet or prevent such a case, although the chance of its recurrence be small, or the accident due to personal causes.

These are, I believe, some of the principal causes which tend to increase the weight of warships. Some others might be named, but they do not, like these, spring from general considerations, and they could not well be discussed here.

Some of these factors exist in merchant ships, but there is one radical difference between the mercantile marine and the navy. In the latter the test of experience is largely wanting. If from any cause there be imposed on a merchant ship unnecessary loads or superfluous cost, there is an immediate and automatic check. She does not pay. Somebody else's ships pay better. Dividends are the touchstone of efficiency. Nothing of the kind exists in any practical shape in regard to warships. You cannot test them by setting them to fight one another, and paper valuations are a poor substitute. But, though the keenness of the competition in the case of fighting ships be less evident and

its realization be delayed, it is none the less real. Its very intensity makes these minor matters of design things of moment. It constitutes the best of reasons for saving small weights and for accepting small risks. Wherever we get similar conditions, as in the international race for the America cup, we find the same necessity for scrupulous design, involving the rejection of all fittings not needed for the decisive race, and the acceptance of minor risks of breakdown. It is interesting to note in the latter connection that the margin of safety is sure in such a case to be very small. The accidents to the Shamrock did not show a mistaken policy in the design, but proved how great was the necessity for the avoidance of unnecessary strength. You could as certainly secure the loss of the race by a few additional precautions against breakdown, such as making your spars or rigging somewhat too heavy as by making them too light. Precisely the same thing is true respecting a closely contested struggle between well-matched naval powers. War is a great risk—the greatest of risks. To try to make it safe is to secure beyond possibility of doubt that it shall be fatal. Not the avoidance of, but the equalization of, risk is the criterion of good design.

It has sometimes been suggested that there is no harm in making a ship somewhat bigger than is necessary for the satisfaction of the main conditions of the design. The saving of small weights is looked on as unnecessary stinginess. This line of thought ignores the fact that the weight involves cost. All the arguments I have tried to lay before you are immensely strengthened when we reflect that these additional weights nearly always impose an expenditure of money in greater proportion than that of weight. Improvements are generally expensive. You make a machine 10 per cent. more costly without making it 10 per cent. heavier. You sometimes do both without making it 10 per cent. more efficient. These objections to economy ignore also the loss of time. Given two designs, in one of which there is a marked increase in elaboration and complexity of detail, and you will increase the time of building faster than the weight or, perhaps, than the cost. Speed of construction is an important element of the naval strength of the country. It increases the available force at any moment and leaves our building resources available for fresh work. Elaboration does precisely the opposite. It takes from the primary features of each ship. It lessens the number of ships to be got for a given sum. It delays their production.

Lastly, in the ceaseless accumulation of these accessory features of warships we have one of the chief factors in their general deterioration. Their armament, armor, and machinery tend to fall behind as improvements in manufacture and design follow one another in rapid succession. This is, of course, inevitable. But nothing so surely tells against a ship as the continued process of sinking her. The history of many ships, as re-

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French Navy	-	-	-	-	-	-	-	-	276,460 H. P.
English Royal Navy	-	-	-	-	-	-	-	-	849,300 "
Russian Imperial Navy	-	-	-	-	-	-	-	-	193,900 "
Japanese Imperial Navy	-	-	-	-	-	-	-	-	122,700 "
Austrian Imperial Navy	-	-	-	-	-	-	-	-	32,900 "
Italian Royal Navy	-	-	-	-	-	-	-	-	13,500 "
Chilian Navy	-	-	-	-	-	-	-	-	26,500 "
Argentine Navy	-	-	-	-	-	-	-	-	13,000 "
The "Messageries Maritimes" Company	-	-	-	-	-	-	-	-	87,600 "
Chemins de fer de l'Ouest: (The French Western Railway Co.)	-	-	-	-	-	-	-	-	Steamships
plying between Dieppe and Newhaven	-	-	-	-	-	-	-	-	18,500 "
<b>Total Horse Power of Boilers in Use</b>	-	-	-	-	-	-	-	-	<b>1,634,360</b>

**WORKS: Ateliers et Chantiers de l'Ermitage, at Saint-Denis (Seine), France.**

**TELEGRAPHIC ADDRESS: Belleville, Saint-Denis-Sur-Seine.**



corded by their draughts from year to year, affords conclusive proof that the growth of minor details amounts in the aggregate to a large variation in a principal feature of the design.

If we had reason to suppose that the contest for naval supremacy in the immediate future would be mild and unimportant, or one in which we should have little cause for sustained national effort, it might still be possible that the subject of this paper would be worthy of the attention of this institution as an interesting problem in naval design. But not many will, I think, say that the matter is one of only academical interest. As the pressure of mercantile competition and maritime interests grows greater, it is certain that this country will have to put forth corresponding effort to keep her place as the greatest of naval powers. It will be dangerous to neglect even small sources of advantage. It may be equally so to suppose that we can permanently face a greater outlay than others for the same unit of naval force. There are signs that there is being applied elsewhere a more rigorous analysis to the methods as well as to the history of naval power. Every improvement in armor, in ordnance, or in structural material will be of value; and these minor matters will afford yet another field for advance, equal in importance to some of those more obvious once. But it is also a field in which advance is very difficult. So many things militate against economy. It is rarely a thing about which one grows enthusiastic. There is much discouragement with it, and some little risk. But the work is there, and has to be done, and it can only be done by the united efforts of all connected with the navy. It is by no means merely a question of office design. It needs the intelligent and ceaseless co-operation of all engaged in the work of construction, and not least that of our subordinate building officers and workmen. Most of all, it needs the continuous help and often the thought and self-denial of naval officers of all ranks, who necessarily exert so great an influence on the details of the ships they have to live in and to fight.

It is well known to many here that this subject is not a novel one. It has engaged the attention of those who direct the affairs of the navy. Much has been done, but it is a work in which much more still remains. It is with the object of attracting more general attention to the practical side of the question that this paper has been prepared.

#### POWER DOORS AND POWER HATCHES.

The Review is in receipt of a bulletin (No. 6) from the "Long Arm" System Co. of Cleveland descriptive of the "Long Arm" system of safety electric power doors. This bulletin will be followed shortly by one more complete and fully illustrated in detail. A full description of the horizontal door and hatch gear will then be added, when further reference will very probably be made in these columns to the devices of the Cleveland company. This safety electric water-tight power door is the outcome of some five years' work and experience in this line in equipping United States naval ships with such devices. The door and its safety electric power-gear have, after very exhaustive tests, been officially approved and the United States government has specified them and the "Long Arm" system of operation on all its large naval ships now building.

It will be of general interest to know that the "Long Arm" system has been installed and is now in service on eleven ships of the United States navy and has been officially specified on twenty more; it has also been installed on two ships of the French navy and on one American sea-going steam yacht; a total of over 800 power doors and 120 power hatches.

Briefly it is claimed for the "Long Arm" system that in case of emergency its power doors and power hatches are closed from a central station on the bridge of a ship, just as if the officer there could reach out and place his hand on each individual door or hatch; that it reaches out to save the ship before the collision happens; that it saves the ship by perfecting the ship's cellular structure (stopping up the holes in the bulkheads), so making her unsinkable; that it does this without endangering anyone by sudden closings, and in such a manner that the power remains with the man at any door to reopen it quickly for escape or for passage on duties, the door reclosing automatically.

Tri-weekly tourist car service by way of the Nickel Plate road. Every comfort of modern train service is provided at very small cost. Berth rates less than half the price of regular Pullman service. Get particulars from nearest agent, or from E. A. Akers, C. P. & T. A., Cleveland, O. 66 June 12

## Photographers Attention!

**T**HE MARINE REVIEW is desirous of obtaining at all times interesting photographs of a maritime character. Should an accident occur, should a ship be stranded, should an unusual repair job show up in a ship yard, the MARINE REVIEW will pay substantial sums of money for any such photographs. Many a man in a dry dock, in a ship yard or aboard ship has a camera. Possibly the master or the superintendent has one. If he can accompany the photograph with a written description (merely facts; we'll furnish sentences, spelling and punctuation), so much the better and so much the more profit for him. The REVIEW pays well for good news articles.

Undoubtedly hundreds of extraordinary repair jobs are going on which would interest naval architects and marine engineers, but which are never published because they are known only to those who are working upon them.

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## DECLINE OF OUR COMMERCE—THE SAILING VESSEL.

A great deal has been written about the diminution of commerce under the American flag, but though patriotism may deplore that said flag is so seldom displayed on blue water, it must not be forgotten that only natural causes are responsible for this order of things. In the early years of American history the ship owners were the wealthy class, and though the loading of one of these clipper ships, say a vessel of 600 tons, had to be done by manual labor, and every single package laboriously hoisted into her what was then considered immense hold, in the vernacular of the Yankee "there was money in it," and one may be assured that as soon as there is a promise of there being as much profit in deep-sea commerce as there is in internal enterprises that now engage their attention, the inhabitants of this country will be quick to grasp the opportunity. In the days of yore when thinking of profit or wealth the Americans instinctively looked oceanward, and the beautiful vessels of a couple of generations ago testified to the Yankees' ingenuity and enterprise. With the introduction of railroads the people moved westward where they found speedier avenues to wealth, leaving ocean trade to foreigners. America is a world sufficient unto itself, and not another large nation is in a position to claim that its marine trade is of minor importance.

No foreign competition, however, is allowed in our coasting trade, and the finest of steel steamships, as well as an immense fleet of schooners, give employment to an army of men who have nautical inclinations.

While the size and speed of ocean mail boats has been steadily increasing, it seems now that a limit has been reached, and as said increase, both in length and speed, did not result in an increase in profits, the ship owners have, naturally, called a halt, and the largest ocean greyhound at present is expected to remain so without a challenge for some time to come.

The coasting schooner also has been growing rapidly, and the Thomas W. Lawson is the only seven-master and the largest sailing vessel afloat. When this ship was launched there were rumors that her successor in the honor of being called "the largest" would have nine masts, and though seamen facetiously suggested that "picket fence" would be an appropriate name to paint on her stern, none doubted for a moment the advisability of building such a craft. As the Lawson is expected to be turned into a coal barge the seven-master may be considered a failure, and the advent of the "picket fence" is indefinitely postponed. Next July the largest sailing ship will celebrate the first anniversary of her birth, and as she is the first American schooner built of steel and handled almost altogether by steam, with telephones and electric sirens, all kinds of patent gear and even a piano, her launching was an event among seafaring men, while John G. Crowley, captain and managing owner, launched himself on the matrimonial sea at the moment of his ship's initial dip into the waters of Quincy bay. Superstitious seamen claim that Mrs. Crowley did not appear suitable as a mascot, as ever since the ship has been in some sort of difficulty, with shallow channels, with hidden bars or with her crews.

The designer of the Lawson was B. B. Crowninshield, creator of the now defunct Independence; and with her powerful machinery to aid the crew she was predicted to prove as handy as a yacht. Quoting a former member of one of her crews: "She was never loaded to her full capacity, which is about 10,000 tons. When shipping on her, seeing all the engines and fancy gear about her, I expected to have a soft snap, but soon found that in a head wind she made two dips in the one hole, and as it takes occasionally an hour to put her about we lost too much of our watch below."

The cost of the Lawson was about \$250,000. Only one short year ago she was the most-talked-about schooner on the coast, while the presence of a piano in her spacious cabin was commented on in all the forecastles that carried almost a half dozen fewer masts.

And now to become a tow barge, numbered like a veritable marine convict, and only spoken of in connection with her keeper—a tug!

F. H.

Mr. William A. Fairburn, naval architect at the Eastern Ship Building Co., New London, Conn., has resigned.

## WORLD'S WEALTH.

"The total wealth of the world, while not exactly known, has been estimated at \$400,000,000,000," says Gunton's Magazine. "This is probably an underestimate of the actual amount of money and property in civilized and semicivilized lands. Of this total the greater part is owned by Americans and Europeans. The United States has somewhere near \$100,000,000,000, or about one-fourth of the whole. The United Kingdom is the richest country of Europe, its wealth being estimated at £11,806,000,000, or £302 per capita. Of the total England's share was £10,062,000,000; Scotland's, £1,094,000,000; Ireland's, £650,000,000. In American money (at \$4.80 pound sterling) Great Britain's wealth in 1895 was \$56,668,800,000. A recent estimate makes it \$59,000,000,000, or \$1,442 per capita (in 1901). The annual income of England's population is said to be \$5,600,000,000, while the yearly saving is \$1,948,000,000. It should be remembered that a large amount of British capital is also invested in the colonies of the empire and in foreign lands.

"France is the next richest nation of Europe. Mulhall estimated its wealth in 1895 at £9,690,000,000, or £252 per capita. A recent estimate of France's wealth makes it \$48,000,000,000, or \$1,257 per capita (1901). According to Mulhall, Germany's wealth in 1895 was £8,052,000,000, or £156 per capita. Prussia's share was more than half (£4,940,000,000); Bavaria's, £949,000,000; Saxony's, £456,000,000; Wurtemberg's, £370,000,000, while the smaller German states had £1,337,000,000. According to a more recent estimate, Germany's wealth is \$40,000,000,000, or \$709 per capita (1901). German money loaned or invested abroad amounts to \$8,000,000,000 or more. Russia's wealth in 1895, as Mulhall estimated it, amounted to £6,425,000,000, or £61 per capita. A recent estimate places Russia's wealth at \$32,000,000,000, or about \$296 per capita (estimating the population in 1901 at 108,000,000)."

## TEST OF SUBMARINES.

During the past week tests have been made of the Holland submarine torpedo boats Plunger and Porpoise. The first boat tested was the Plunger for standardization in her light condition. She began her run over the half-mile course under two cylinders, covering the distance in 4 minutes and 9 seconds. The return trip was made in 4 minutes 31 seconds, showing an average of 6.9 knots for the mile. With three cylinders the first half of second trial was covered in 3 minutes, 30 seconds, and the return trip in 4 minutes, an average of 7.7 knots. The last of the runs, made under four cylinders, showed the Plunger to be the fastest boat of all the submarines yet tried under this condition, for she covered the first half mile in 3 minutes, 19 seconds, and the second in 3 minutes, 26 seconds, showing a speed of 8.87 knots.

The Porpoise, submerged, is said to have made a half-mile in 5 minutes and 5 seconds. Her average rate, submerged, was 5.92 miles per hour.

Colonists and homeseekers' excursion rates to west, north-west and southwest by way of the Nickel Plate road. Call on nearest agent, or E. A. Akers, C. P. & T. A., Cleveland, O.

69 June 12

## Wanted to Purchase.

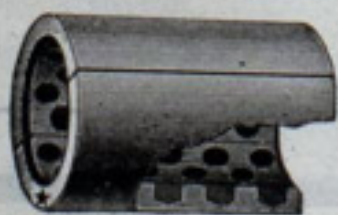
One marine boiler about 10x10 ft., 150 lbs. steam pressure, or two about 14x5 ft., of about 150 lbs. steam pressure; also two simple engines about 18x18 in., or two compound about 14 and 28x18 in. Must pass inspection on lakes. Address Canadian Transportation Co., Merchants' Bank Building, Montreal, P. Q.

May 21

## Sea-Going Suction Dredges For New York Harbor.

U. S. Engineer Office, Philadelphia, Pa., May 14, 1903. Sealed proposals for constructing two large, steel, twin-screw, suction dredges, will be received at this office until 12 o'clock noon, June 30, 1903, and then publicly opened. Proposals for constructing both dredges or one will be received. Information furnished on application. J. C. SANFORD, Capt. Engr.

June 18.



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